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The Seaplane Era

FOR some time past it has been obvious to knowledgeable observers that Imperial Airways were about to adopt the large flying boat as their main class of aircraft for Empire services. The features of the Short boat ordered by Imperial Airways, which was described in *Flight* of September 26, gave a clear indication of that tendency, and in our last issue a South African correspondent gave circumstantial details of the coming conversion of the Africa airway from a landplane to a seaplane service. The most definite statement of the new policy comes, however, from Mr. Hudson Fysh, managing director of Qantas Empire Airways, Ltd. In a brochure issued by the Australian firm he writes: "Imperial Airways have had many years' experience with large flying boats. . . . Imperial Airways, then, having come out with a stated firm preference for flying boats for the England-Australia service, it can be accepted that this line of development is the correct one, at least while aircraft are in anything like the form we know them to-day." Thus is truth made known from the ends of the earth.

The late Marquis of Pinedo first laid down the principle that for a flight to Australia the flying boat was the right class of aircraft. For a forced landing on the earth he held that the boat hull gave him a better chance of escaping disaster than was given by the wheels of a landplane, while for crossing water the seaplane naturally held all the trump cards. Nowadays we give less consideration to the chances of a forced landing. Engines are very reliable, and Imperial Airways machines always have a reserve of power. The flying boat is now destined to become the standard form of aircraft for very long journeys, chiefly because such journeys must be made in large machines, and to provide aerodromes large enough and firm enough for the huge machines of the future would be a very difficult problem. Nature has provided the landing places for seaplanes, and the

oceans are quite indifferent as to the weight of aircraft which they are asked to support.

Mr. Hudson Fysh is very emphatic on the absolute necessity of having large machines. "In America, on the internal services," he writes, "no more than one night is spent in the air, and, despite the smallness of the cabin of the popular Douglas and Boeing types used, passengers are made surprisingly comfortable for that night; but if such conditions were considered for three or four consecutive nights the discomfort for passengers would be far too great." Night flying will, of course, be a familiar feature of Empire air routes in the near future, and the Short boat is arranged to provide comfortable bunks for all the passengers carried. This must mean that the maximum number of passengers which the boat could actually seat will not be carried, but the sacrifice of payload will not be too great because a great proportion of that load will consist of mails, which do not need comfort and a margin of space.

New Routes

The Empire flying boats will start from some seaport in England and will fly across Europe and the Mediterranean, across the desert to the Tigris at Baghdad, down the Persian Gulf and across India, and along the Eastern archipelago to Darwin. A straight route overland from there to Sydney would be too much of a land crossing even for the flying boats of the future, and they will presumably cut across to the Gulf of Carpentaria, cross the base of the Cape York peninsula, and coast down Queensland, connecting with various important towns such as Townsville and Rockhampton to Brisbane and Sydney. Later on they will cross the Tasman Sea to New Zealand. This route will necessitate a new organisation of Australia's internal services, as Charleville, Longreach, and Cloncurry, and the other towns on the old Qantas route would never tolerate the loss of their trusted air connection with Brisbane.

The same sort of route will be followed in Africa. The Nile and the Great Lakes will provide "landing

grounds" for the first part of the journey, and then the flying boats will follow the coast to Durban. So will come about the seaplane era. *Flight* has always advocated it and has foretold it, and is now convinced that Imperial Airways have chosen the way of wisdom.

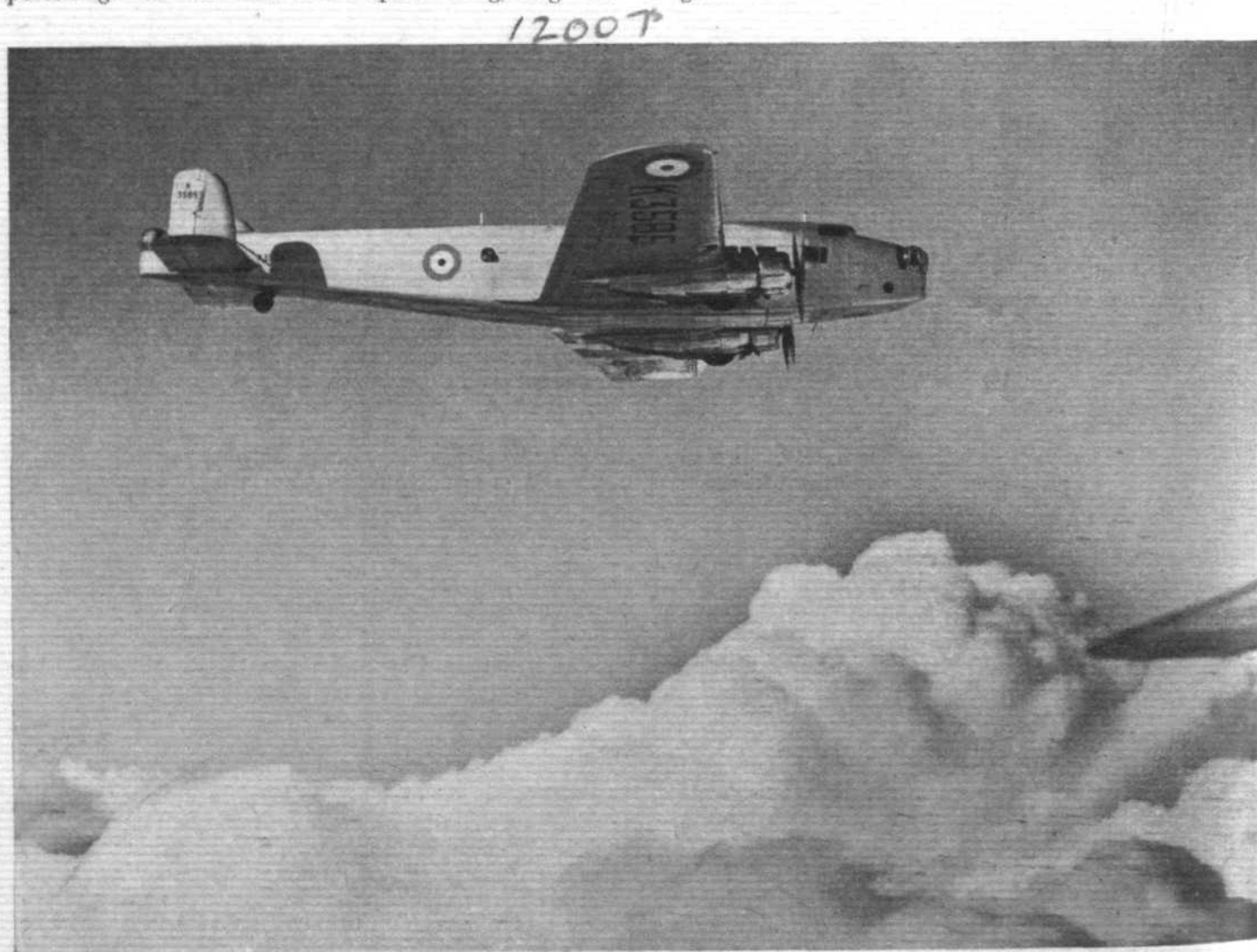
Output

ALTHOUGH careful to point out when the R.A.F. expansion was first announced that this was not to be regarded as a panic measure, the Air Ministry by its subsequent actions clearly indicated that a real emergency had arisen. The construction firms were given greater freedom than they had previously enjoyed; new aircraft, it was announced, would not be expected to go through quite such extensive service trials with squadrons, and altogether the Air Ministry placed itself in the hands of the aircraft industry to an encouraging extent, knowing full well that the confidence thus shown would not be abused.

It is impossible to visit one of the aircraft works engaged on the production of service aircraft without becoming impressed by the almost appalling amount of equipment which the modern military aeroplane has to carry. The number of "gadgets" seems to grow at an alarming rate, with the result that the mounting of military equipment occupies a quite disproportionate percentage of the man-hours spent in getting the

machine finished and ready for service. When the Air Ministry first made the change-over to all-metal construction, the firms had a very difficult period while learning to manipulate the new structural materials. Who does not remember the first clumsy attempts at rolling or drawing steel strip, for example? That difficulty, and many others, has been overcome long ago, and the various firms have developed their own systems of construction to a point where they no longer present any great manufacturing difficulties. In fact, one may say that the primary structure has now become of secondary importance, at least in certain classes of military aircraft.

In order to reduce the number of man-hours with which the installation of military equipment runs away, one wonders whether certain changes in the primary structure of the fuselage might not give a very considerable speeding-up. For instance, it might be possible so to design the fuselage structure that during the early stages it consisted merely of a narrow floor carrying two or three frames or bulkheads to which all equipment could be attached, the fuselage sides and decking being built on when all the equipment was in place. With easy accessibility from all sides, the equipment would go in quickly, and more workers could "get at it" than is possible with a girder type. This would apply particularly to the smaller types, such as single-engined single-seaters and two-seaters.



A SERVICE HEAVYWEIGHT. The Armstrong Whitworth bomber transport monoplane flies high and fast, presenting a magnificent "shot" for *Flight's* photographer. With two Siddeley Tiger VI engines not only does the machine possess remarkable weight-carrying properties, but it is extremely fast for an aircraft in its class and has, in addition, a long range. Other photographs appear on pages 410b, 410c and 414.

The Outlook

A Running Commentary on Air Topics

The Range of Bombers

THE past few weeks have brought forth the inevitable queries about the distance a modern bomber can fly before releasing its projectiles and returning to friendly territory.

On getting down to brass tacks and ignoring all the loose talk on the subject which has been rife, one discovers that distance to be far shorter than might at first have been supposed.

Great Britain, on her own admission, has been marking time in the development of heavy bombers (she is "at the double" now), and even though, at the moment, she may not be in the front rank so far as speed is concerned, it seems fairly certain that the latest types of bomber to go into service with the R.A.F. have little to apologise for in the matter of range. The Heyford, for example, can fly for over 900 miles non-stop. We believe that we are correct in saying that none of the new French *multiplace de combat* types (most of them now are doing about 200 m.p.h.) can beat or even equal this, and the Martin bomber, which is generally conceded to be—to borrow a phrase from its country of origin—"the tops" among foreign machines in its class, has a range at its normal all-up weight of only about 700 miles, cruising at 170 m.p.h. In "maximum overload" condition (i.e., with excess fuel load) it is said to make 1,400 miles. The bomb load is approximately the same as that carried by comparable British types.

When these figures for range are halved (assuming that the employers of the machines concerned would not instruct their pilots to land in enemy territory through lack of fuel after completing a raid), it becomes apparent that perhaps many of the fears which have been expressed from time to time by the lay Press are unfounded.

Not that there is any cause for complacency regarding the future, for in all probability there will be a pronounced increase in the range of bombers within the next two or three years.

Future of the "Pou"

THERE are two ways of producing any article cheaply: (a) By so simplifying its design that it can be made in small quantities with the crudest of tools, or (b) by mass-production with elaborate tools, the cheapness then being a result not of ultra-simple design but of a large output which justifies the laying down of a huge factory equipped with every known aid to quantity production. The cheap motor car of modern times is an example of the latter, but the motoring community has had to wait some thirty years for cheapness to be achieved.

In an article published in this week's issue of *Flight*, the author expresses serious doubts concerning the future of the *Pou-du-Ciel*, a type of aeroplane which is pre-eminently an example of the article so simply designed that it can be produced with crude tools. *Flight* does not hold the view that the *Pou-du-Ciel* is the answer to every young man's prayer, nor that in a few years' time there will be tens of thousands of these machines obscuring the sky. But we do believe that the *Pou* forms one way in which quite a number of people can get into the air. We do not regard the *Pou* as the only solution. The Drone is another, and doubtless now that limited freedom is being granted to very light aircraft we may expect to see a good many others.

Incidentally, in the article in pp. 410 and 411 our contributor seems to be under some slight misapprehension concerning the freedom of the *Pou*. There is no need for the *Pou* pilot to be satisfied with "the doubtful pleasure of flying round and round a field on fine days in a solo machine." He can now fly from one aerodrome to another, or from his own field to that of a friend. The regulations merely demand that the pilot shall carry a third-party insurance, and stipulate that he must not fly low over populous districts.

Room for All

AS we see it, it is not a case of the *Pou* or the others but of the *Pou* and the others. There is room for all. What is the sequence of events in the life of an average motorist? Is it not, in very many cases, that he begins as a lad of eighteen or so with a very second-hand motor cycle, bought for a couple of pounds, scrapes together enough for a new model, graduates to a small car, and finally the car which he really wants, but which he has not been able to afford before? Hitherto there has not been in flying any "opposite number" to the £2 motor bike, and hence the "first step" has been impossible to the vast majority. Will not the modern young man, or many of him, at any rate, take the view that although the *Pou* may not be ideal, and although solo flying is likely to pall in time, solo flying in a *Pou* is better than no flying at all?

The aeronautical parallel to the case of the motorist may well be a beginning with the *Pou* and a graduation via the Drone, the Praga Baby and the Aeronca to the private owner's machine as we know it to-day—or perhaps, by then, to the really complete and fully equipped machine rendered "cheap" by real mass-production.

Crystal-gazing

EVEN more interesting than reading prophecies about air travel of the future is to study what the prophets of a few years ago said about air travel of to-day. Some of their shots were very near the mark, others widely astray.

The other day, for instance, we happened to be re-reading a book published in 1917, "Air Power," by Claude Grahame-White and Harry Harper. Talking about internal air lines, the authors took as an example the route from London to Manchester. This, they opined, would be covered by "express passenger aircraft" in 1½ hours—exactly, as it happens, the summer schedule of Railway Air Services machines between these two cities.

In forecasting fares, however, they were wide of the mark; they thought that the figure might be £3 return, as compared with the pre-war first-class return rail fare of £2 9s.; actually, it is £4 10s. return, as compared with to-day's rail fare of £2 6s. What upset their calculations, evidently, was their idea that each machine would carry fifty passengers. They had argued this from the fact that a 500 h.p. machine had carried nearly thirty passengers before the time at which they were writing. (Nor could they conceive that eighteen years later 2,000 h.p. would be expended in dragging just that same number of passengers through the air!)

Verily, the path of the prophet is hard. One would hate to forecast times and fares for internal air lines in, say, 1955—especially with such a prospect of another nice long war to lead civil aircraft design back up the wrong street again.

Nomenclature Run Riot

FOR some years now the fancy type-names evolved by car manufacturers for their products have been a joke among the motoring public. Nobody seems to have tumbled to the fact that the position in the aircraft world is funnier still. Many machines now have two or more correct alternative designations; in some, type-names and numbers are strung together; others link up with the type of engines fitted; Imperial Airways have added to the fun by labelling all their types with class names, *à la* locomotive; and the R.A.F. has added the final straw by perversely inventing new names for nearly everything, even to the extent of transmuting a perfectly good seabird into an amphibious mammal.

Not that all this really matters; it is merely the secret sorrow of a member of the staff of *Flight* who looks back a little wistfully to the days when everyone was content to have the name of one good honest bird or beast to describe one type of aeroplane, and manufacturers hardly ever failed to invoke Alliteration's Artful Aid in naming their products.

Ambition

THE announcement of the recent formation of a new aircraft finance company under the title Aircraft Industries Corporation, Ltd., with an authorised capital of £150,000, has called attention to certain ambitious plans which may materialise "when the present political situation becomes clearer." Mention has been made of an issue for half a million "to build and erect flying boats in this country," as the somewhat quaint phraseology has it. Now to operate a fleet of flying boats necessitates an operating company with adequate finances. It seems fairly certain that Imperial Airways will not purchase these boats, since they have already placed a large order with Short Brothers. This is apparently realised, as the statement is made that another issue contemplated will be for the purpose of developing a trans-oceanic air line company. Being self-contained would appear to be the ideal of the new corporation, as mention is also made of yet a third issue to be made, this for the construction of aero engines.

It has been announced that Lt. Col. J. T. C. Moore-Brabazon, M.C., M.P., F.R.Ae.S., president of the Royal Aeronautical Society, is on the board of the corporation, and that an advisory committee has been formed "composed entirely of technical experts in the various branches of the aircraft industry" to advise the board on future developments. So far their names have not been divulged, but they will be awaited with considerable interest.

Proof of the Pudding

IN 1931 Imperial Airways commissioned its fleet of eight H.P. 42s of the *Heracles* class. There was scepticism from many quarters. Many a wiseacre designer—not only in this country—blew the dust from his slide rule and wagged his head over his calculations. Imperials would find out. And there were operators who beheld aghast the rows of cabin windows. Imperials would see . . .

Then the bulky newcomers got into their stride. Their extensive underslung fuselages (with a big chunk of monocoque!) and towering superstructures became familiar sights on many an aerodrome on Imperial routes.

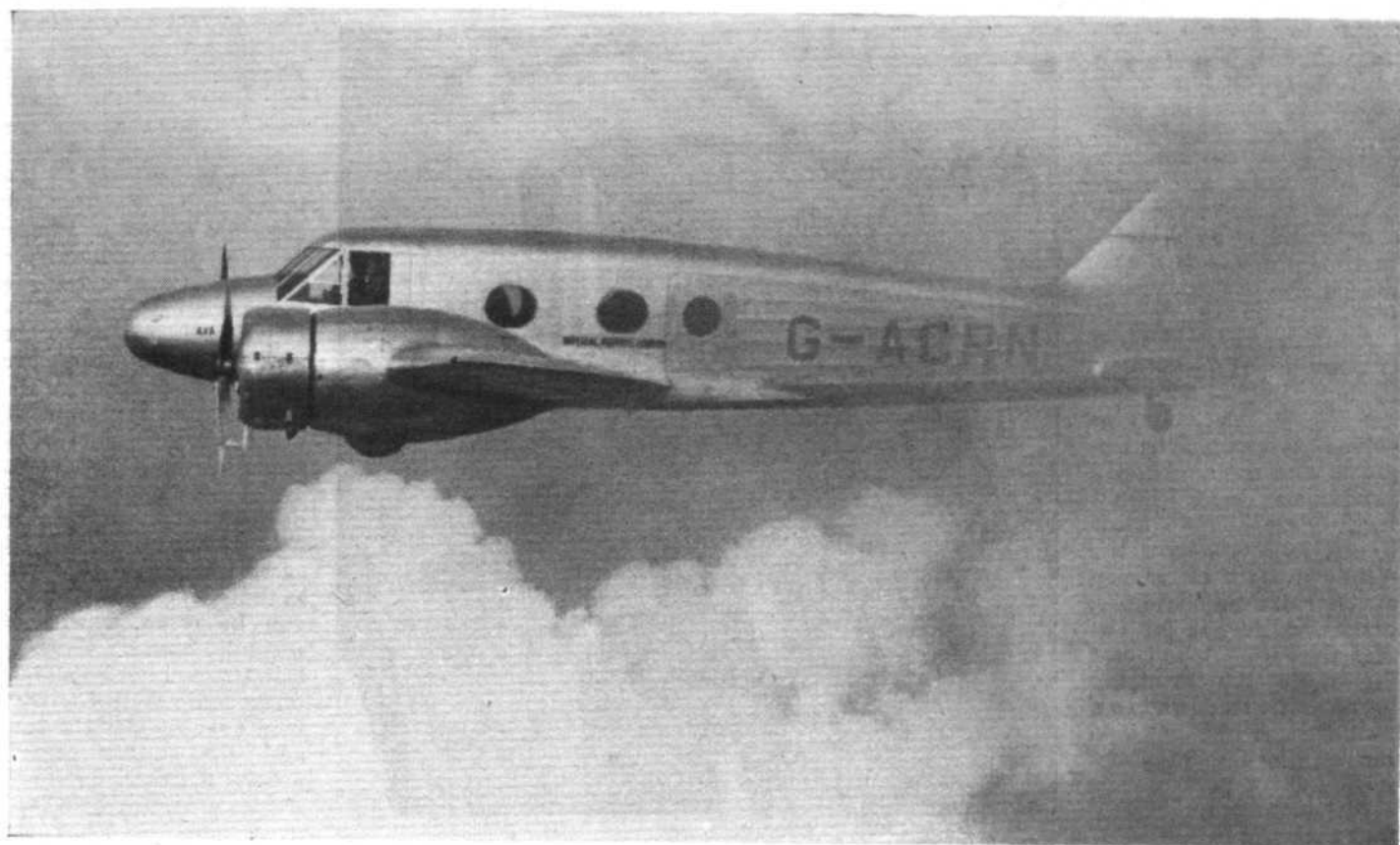
Reports and opinions began to spread. More comfort than in a pullman. Conversation in normal tones. No vibration. And pilots who, perhaps, had shrugged their shoulders before flying the machines, spoke of their easy handling and amazing take-off. Landings presented no big difficulties, although there was nearly seventy feet of aeroplane behind the cockpit and plenty below. That was about four years ago.

To-day every one of those machines has spent more than 5,000 hours in the air. The fleet has completed between four and five million miles and not a passenger has been injured. Incidentally, the recent ground mishap to *Syrinx* at Brussels (in which nobody was hurt) brings to mind the reliability of the two Short machines, also 38-seaters; though they have not been in service so long as their hangar-mates they, too, have added a great deal to the already high prestige of Imperial Airways.

Doubtless this "big stuff" will be with us for several months yet. Let us hope that the design of whatever comes along to take its place will be as untrammelled by convention.



ANOTHER NOTABLE NEW SERVICE TRANSPORT: Wing-tip slots and slotted flaps are incorporated in this Handley Page bomber transport monoplane, seen here during a test flight with Capt. Cordes at the controls. The engines are two 760/810 h.p. Siddeley Tiger VI, fourteen-cylinder two-row radials. (Flight photograph.)



INSTRUMENT FLYING

SEVERAL millions of miles have been flown—since the days when pilots convinced themselves that clouds, in some peculiar but quite unmistakable way, affected the compass of the machine flying through them. The needle, after all, revolved madly while the aeroplane, as far as could be ascertained through sensory impressions, continued to fly serenely on a straight course.

During those millions of miles courageous individuals, in pursuit of meteorological or other knowledge, have fought their way in totally unsuitable Service machines through thousands of feet of cloud. Marks on the floor, marks on the dashboard, pieces of string and a memorised series of speeds, time intervals and control movements were once the pilot's only safeguards when the almost inevitable spin started. These pilots probably thought that life had been finally simplified when a series of twinkling red lights replaced the pieces of string.

Then came the turn, bank and pitch indicators, more or less as we know them to-day, and C.F.S. instructors developed and perfected a method of training suitable even for the most garrulously sceptical pilot—and there were a lot of them in those days.

Instrument-flying training is still very largely a matter of psychology, since the pilot must learn to ignore all his sensory impressions, and the greater his experience the greater is his difficulty in ignoring them. It would be interesting to know whether a person who had never flown at all could be taught to fly by instrument in a shorter period than any normal pilot; such a person would, at least, find no need to be a kind of Jekyll and Hyde when under the hood.

It is quite obvious, for instance, that a nicely propor-

The Technique of Modern Training in Blind Flying: Instruments Employed and Their Methods of Application

By H. A. TAYLOR

tioned turn might be construed as level flight by a pilot flying in cloud without instruments—and turns have a nasty little way of increasing their tightness if persisted in without corrective aileron. As the nose dropped in a steeper turn the speed would rise, the pilot would ease back the stick and the turn would become a vertically banked spiral; it might even become a tight turn out of the horizontal plane with the A.S.I. showing, alternately, stalling and maximum speeds. Eventually,

in his worry, the pilot would, in any case, apply altogether too much elevator, and the machine would stall and spin. That is just one of a series of possible sequences, and is given merely to indicate some of the possibilities when a pilot is depending on his own sense of balance. A careful and experienced pilot might, nevertheless, fly straight and level in clouds for several minutes.

The instability of a normal aeroplane in a natural turn is the reason for just one of the little tricks which have been developed by the pioneers of blind flying. An aeroplane in a gentle *flat* turn—using aileron not only to prevent an increase of bank but to cause an outward skid—is perfectly stable, and all turns are made to a certain formula in instrument-flying training.

In an article of this kind it would be impossible to describe in detail how normal blind-flying instruments are made to work with scientific accuracy, but the actual principle is fairly simple. A gyroscope resists attempts to move it from the particular plane in which it lies. In the case of instruments indicating actual displacement the gyro axis remains in its original position and the displacement angles, in one or two planes, are given. In the case of turn indicators, where a *rate* of turn must be given, the indication is obtained from the fact that the gyro, with its axis lying across the direction of travel,

tends to precess away from the direction of turn with more or less force depending upon the rate of turn. Automatic pilots merely carry the action a stage further by transmitting the forces, through a hydraulic relay system, to the controls, thus correcting the various deviations.

Needless to say, mere changes of attitude may be indicated without the use of a relatively involved gyroscopic instrument, and both damped pendulums and liquid levels are also used. These, however, have the disadvantage of being affected by accelerations, and, were it not for the fact that weight and cost are quite important, a gyroscopic indication would probably be used for all angular displacement indicators.

Although turn indicators are manufactured by several firms in this country, including Smith's Aircraft Instruments, Ltd., S. G. Brown, Ltd., and Cooke, Troughton & Simms (the Schilovsky indicator), the Reid and Sigrist instrument is more or less typical, and is largely used for instrument-flying training; the familiar dial of this particular turn and bank indicator is, therefore, used in the ensuing description of modern instrument-flying technique.

The basis of the entire system lies in the knowledge that every serious flying error is caused by misuse of the rudder control. Starting with the rudder, therefore, the instrument-flying student is taught first to retain control in each separate axis, one at a time, and for many hours afterwards he corrects on the turn, bank and pitch indicators in that order. In America the method is known as the "One-two-three" system, and it is probable that, even after very long practice, the pilot is still working in sequence, though with much greater rapidity of reaction.

Using the rudder alone, he concentrates on the business of keeping the turn-indicator needle in the central position, and once he has mastered the art of bringing the needle back almost before it has started to move he will never get into serious difficulties. Thereafter the ever-reiterated cry is, "First stop the turn with the rudder, and



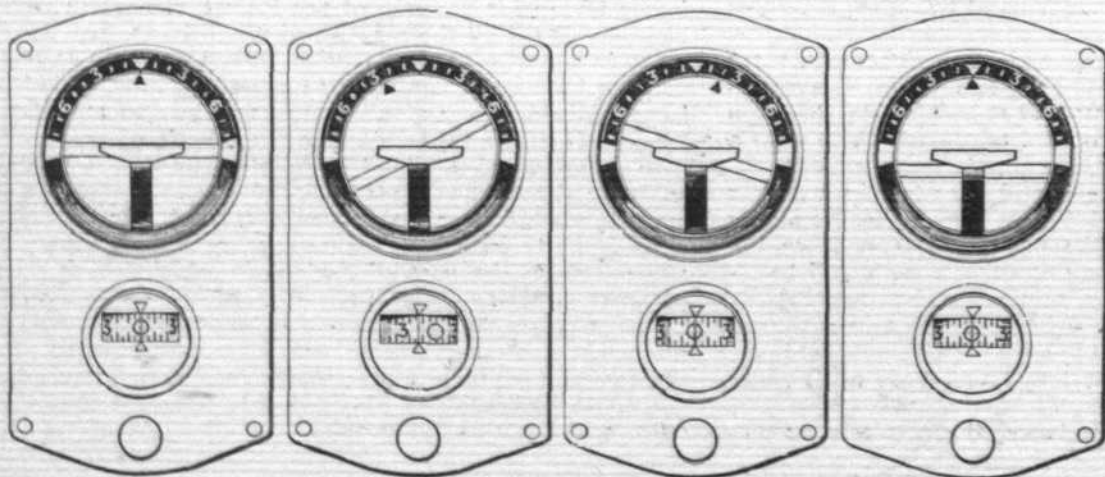
The standard instrument-flying training equipment, as fitted on a D.H. Leopard Moth dashboard. On the right of the Reid and Sigrist turn indicator is the pitch indicator, which is showing a steep angle of climb. (Flight photograph.)

then correct the resultant sideslip with the ailerons." The pilot's eyes move from the lower to the upper needle and then to the pitch indicator. He is taught to fly level on the latter rather than on his air-speed indicator, if only because pitot tubes have a little way of collecting ice accretions, and only the pitch indicator can be entirely relied upon in winter cloud flying.

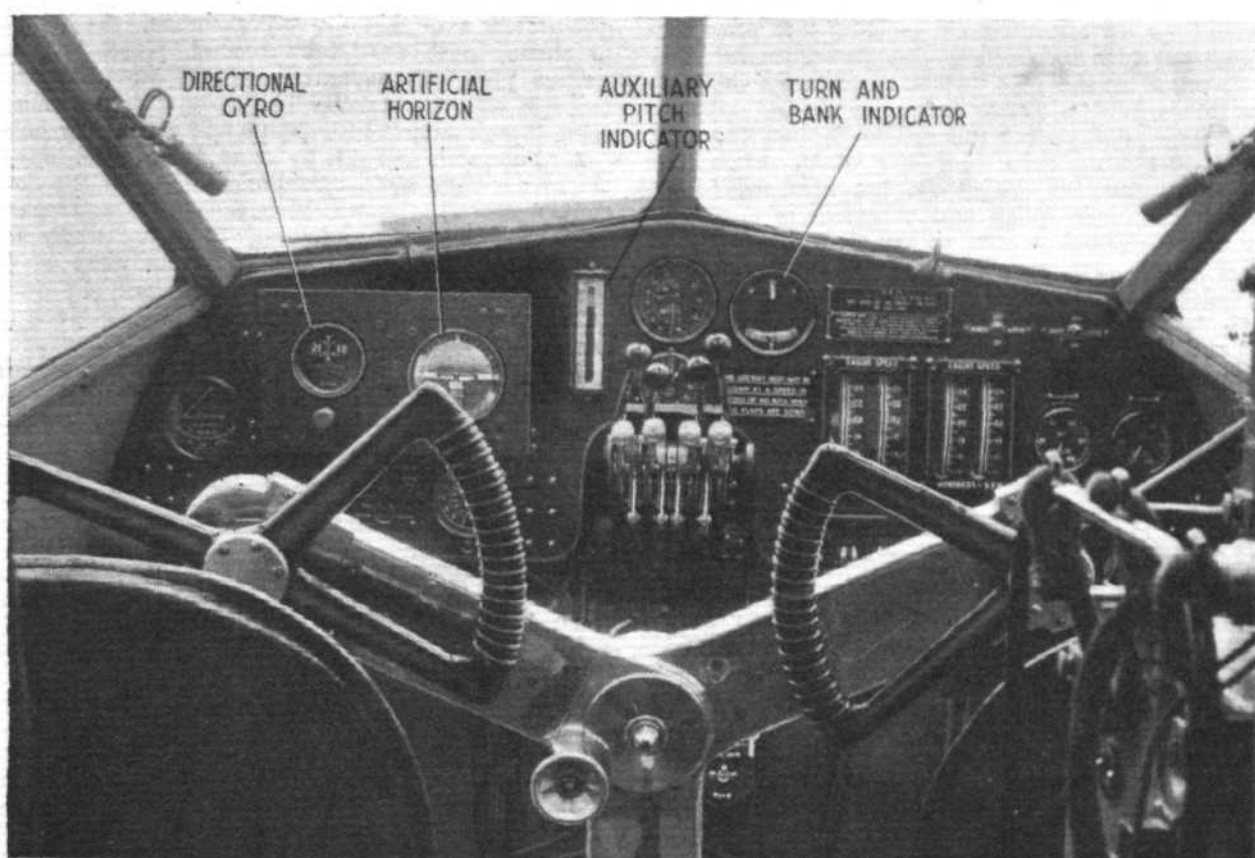
As already mentioned, a definite technique of blind turns has been developed. These are made with an outward slip, so that the nose will not drop and the speed will remain constant, so that level, straight flight can be resumed without difficulty and so that the compass will not be unduly disturbed. With the stick held over against the turn and the rudder pressed gently, the turn, bank and air-speed indicators will remain steady. Actually, the recommended rate is at about $1\frac{1}{2}$ turns a minute on the scale, and the lateral-inclinometer needle is kept in line with the turn-indicator needle throughout the turn.

Having mastered the arts of holding a steady course at different air speeds, while gliding or climbing, and of making firm turns, the pupil then finds it necessary to make a careful study of the idiosyncrasies of the compass—idiosyncrasies which, though slight, are quite ineradicable, being inborn traits of the magnetic compass. Although the compass needle is, on gentle turns, almost a turn indicator between S.E. and S.W., accelerations cause temporary changes on easterly and westerly courses, and on northerly courses there are very distinct differences between the movements of the needle and of the machine. By means of a memorised series of turning rates and course changes it is possible for a pilot to stop a turn with creditable accuracy even when flying towards the north. The fact that a great many pilots every month fly triangular courses successfully while under the hood and being tested for their tickets shows that it is all a matter of knowledge. While flying straight and level a compass can be depended upon entirely.

Nevertheless, the directional gyro, which, by means of the ever-useful gyroscopic traits, registers all changes of



How the Sperry artificial horizon and directional gyro respond to different evolutions. From left to right the instruments are indicating straight and level flight, a gentle turn to right (with the gyro drum moving from left to right), a sideslip to the left and a straight climb.



A typical dashboard layout for a commercial machine—in this case a D.H. 86 with Sperry equipment.
(Flight photograph.)

course, relieves a pilot of these problems. This device, which forms part of the Sperry instrument-flying equipment, is set from the compass and will enable the pilot to hold a course for some twenty minutes, after which the effect of precession is noticeable and the gyro must be reset. A complementary instrument, the artificial horizon, gives the pilot an indication of both his fore-and-aft attitude and his bank, whether in a turn or a sideslip. He simply endeavours to keep the fixed aeroplane model in correct relation to a moving "horizon" which is indirectly actuated by a caged gyroscope having free movement in two axes. The gyroscope, in fact, remains stationary, and registers the movement of the entire aeroplane around it in the different planes. The horizon remains operative up to a ninety-degree bank, after which it goes temporarily out of action for very obvious mechanical reasons, and the directional gyro is accurate up to a bank of about forty degrees.

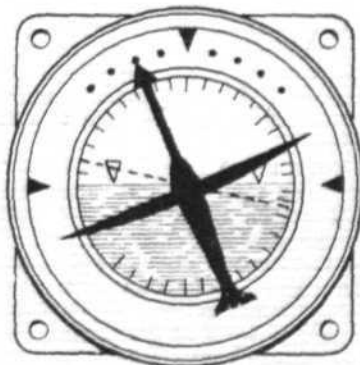
Although no pilot of the type of machine to which the Sperry equipment is normally fitted is likely to get into difficulties with these easily read instruments, the possibility is always there, and the regulations demand the fitting of a supplementary turn indicator proper which will not only continue to register in all attitudes but which will also enable recovery from a spin to be made.

A form of combined turn indicator and horizon, the Gyorizon, has recently been put on the market by Reid and Sigrist. Based on the turn indicator, this instrument also registers the relative attitude of the machine against both in the turn itself and against a bank or

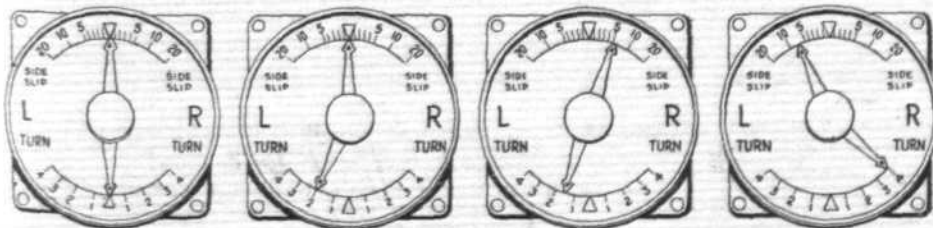
sideslip level. Changes of fore-and-aft attitude are indicated on a separate liquid level. The Gyorizon functions in any attitude.

Few sensations are more physically disturbing than one's first spin under the hood. Although a pilot may be accustomed to the sensations of spinning and be un-

The new Reid and Sigrist Gyorizon which is indicating, in this sketch, a correct turn to the left. The dotted line shows the level of the lateral indicator in an over-banked turn to the left. In a "blind" turn, of course, the liquid level would be in line with the "wings."



disturbed by them even when cut off from the outside world, the human balancing organs cause great mental and physical havoc at the moment of recovery. When the machine has actually stopped spinning and is in a vertical or near-vertical dive one has the strongest possible sensation of continued spinning—though in the *opposite* direction. Hence the absolute necessity for plenty of



The R and S turn indicator in action. The readings from left to right show respectively, straight and level flight, an accurate turn to the left, a correct "blind" turn to the left and a spin to the right.

practice and for an unmistakable technique of recovery.

In a spin the turn indicator needle moves to the limit in the direction of the spin, while the sideslip or bank indicator shows quite a strong indication in the opposite direction. The pilot pushes full rudder against the spin until the needle flicks right over the scale, when the rudder is centralised as the needle has returned to its proper position. So quick and complete is a normal recovery with the stick central rather than forward that there is a danger of a second stall, and the throttle is usually opened as soon as everything has settled down. The pilot with a precariously poised interior then opens the hood and breathes a little slipstream before continuing his self-imposed torture. He becomes used to it in time.

Although the instruments used for flying in conditions of poor or zero visibility will undoubtedly alter and improve year by year so that the transport pilot will have more and more of his conscious or subconscious mental

equipment available for other duties, the instrumental problems must now take second place. A properly trained pilot will never himself get into difficulties, but there is still the steadily increasing risk of collision and some "proximity" instrument will eventually be needed.

Air line pilots can still fly blind in safety so long as they are in constant radio communication with the aerodrome control officer, who will give each one a recommended height. Eventually, however, there are likely to be so many machines on the various routes that a personal system of this kind will need revision. In due course pilots on different services will probably be given different heights at which to fly.

The progress of the various blind-landing systems suggests that one or other of these will eventually be installed at all major airports, and the control problem will become even more involved. New developments have always meant new problems.

ROYAL AERO CLUB NOTICES

PRIVATE Civil Flights to French Colonial Territories.—The Club is asked to draw the attention of all pilots to the procedure to be followed and the advance notice required to be given to the French Air Ministry relating to flights to various French territories overseas.

Tunisia, Algeria, Morocco.—If a flight is to be made into the interior of these territories, previous permission must be obtained, and the French authorities require at least ten days' notice, except in the case of flights across the Sahara, when at least twenty-one days' notice is required. In cases of flights along the coastal districts of these territories, no previous permission or official notification is necessary.

French West Africa, Senegal, French Guinea, Ivory Coast, Dahomey, French Cameroons, French Equatorial Africa, French Somaliland.—Previous permission must be obtained except in the case of flights along the coastal districts of these territories, when notification of the proposed flight should be made. The French Government desire to be approached at least ten days in advance.

Indo-China.—Previous permission must be obtained. The French Government desire to be approached at least fourteen days in advance.

Syria.—Previous permission must be obtained if it is proposed to carry in the aircraft wireless apparatus, firearms, explosives, cameras, cinematograph apparatus, pigeons or mails, or if it is desired to land at the military aerodromes at Palmyra and Rayak. In other cases notification only is required. Pilots, or their agents, should apply for permission (at least fourteen days in advance) or make notification (at least ten days in advance) to: The High Commissioner, Diplomatic Bureau, Beirut, Syria.

* * *

General Council of Associated Light Aeroplane Clubs.—The following Clubs have recently joined the General Council of Associated Light Aeroplane Clubs:—Edinburgh Flying Club, Lincolnshire Aero Club, Cinque Ports Flying Club.

HAROLD E. PERRIN, Secretary, R.Ae.C

U.S. EXPANSION—in SIZE and NUMBERS

ACCORDING to information received from an American correspondent, the four-engined Boeing 299, despite its 105-ft. span, is being referred to at the Boeing works as the "small" bomber. The really large machine is still under construction. This will be fitted with four Allison "X" type 1,000-h.p. Prestone-cooled engines. One report states that this machine will be able to cruise at 230 m.p.h. for 6,000 miles.

The Curtiss Company is constructing a twin-engined attack machine (this is of particular interest because up to the present U.S. attack types have employed but a single engine) and an all-metal single-seater fighter with retractable undercarriage, for the Navy. Stressed-skin construction will be employed for the fighter, departing from the usual Curtiss technique in fighter construction. Some 600 workmen have recently returned to work at the Curtiss plant for commencement on the 135 scout-observation biplanes ordered by the Navy. Deliv-

eries of these machines will start in August, and by October will reach the schedule of twelve machines a month.

A contract was recently placed by the U.S. Navy with the Sikorsky concern for a large experimental flying boat basically similar to their S.42 type. The span will be 110ft., length 60ft., and there will be four engines. Immediately following the Sikorsky order the Consolidated Aircraft Corporation was awarded a contract for 60 patrol-type flying boats similar to the P2Y machines which made the massed flight from San Francisco to Hawaii last year.

Production continues on Northrop attack monoplanes, and it appears that deliveries will be completed in March, 1936.

Units equipped with the Boeing P26A pursuit monoplane are sending these machines to the Boeing factory for the installation of flaps.

Work has begun on a large batch of Consolidated two-seater pursuit monoplanes.

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in the list.

Oct. 12-28. International Aircraft Exhibition, Milan.

Oct. 21. R.Ae.S. Lecture: "Piloting Commercial Aircraft," by Maj. H. G. Brackley, 6 p.m., Institution of Electrical Engineers.

Oct. 23. Royal United Service Institution Lecture: "The Defence of the Population Against Air Attack," by Wing-Commr. E. J. Hodson, at 3 p.m.

Nov. 4. R.Ae.S. Lecture: "The Prevention of Ice Accretion," by B. Lockspeiser, 6 p.m., Institution of Electrical Engineers.

Nov. 13. Royal United Service Institution Lecture: "Oil from Coal in War Time," by Col. W. A. Bristow, at 3 p.m.

Nov. 18. R.Ae.S. Lecture: "Cooling Problems, with Particular Reference to the Work of the 24-ft. R.A.E. Tunnel," by Dr. G. P. Douglas, 6 p.m., Institution of Electrical Engineers.

Nov. 29. Yorkshire Aeroplane Club. Annual Ball, Hotel Majestic, Harrogate.

Dec. 2. R.Ae.S. Lecture: "Undercarriage Design," by G. H. Dowty, 6 p.m., Institution of Electrical Engineers.

Dec. 6. Hampshire Aeroplane Club: Tenth Annual Dinner and Dance, South Western Hotel, Southampton.

Dec. 16. R.Ae.S. Lecture: "Wireless and its Application to Commercial Aviation," by Capt. J. M. Furnival, 6 p.m., Institution of Electrical Engineers.

1936.

Jan. 22. Royal United Service Institution Lecture: "The Expansion of the Royal Air Force," by Air Marshal Sir C. L. N. Newall, at 3 p.m.

Mar. 10. Royal United Service Institution Lecture: "The Development of Civil Aviation," by Lt.-Col. F. C. Sheldermine, at 3 p.m.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Finding Her Feet

The Sikorsky S-43 amphibian (two 750 h.p. Hornets) has lately been testing her wheel undercarriage at Rentschler Field. One take-off was made in 16 sec. at a gross weight of 18,500 lb. after a run of 884ft.

One Hitch and—

Mr. A. H. Broadbent left Port Darwin, Australia, last Thursday morning in a Puss Moth on an attempt to break the record for a solo flight to England. He took off from Gwadar, near the Persian border of Baluchistan, at 5.30 a.m. on Monday, but was unlucky enough to crash at Basrah that night. He is continuing by Imperial Airways.

—Another

Meanwhile, Mr. David Llewellyn and his one-time pupil, Mrs. Jill Wyndham, who, in a Parnall Heck, are out to break the London-Cape record, have made a forced landing between Aboukir and Cairo. On their previous attempt they turned back at Marseilles. They hope to resume their present effort almost immediately.

Ministerial Festivity

Observing an old German custom of holding a *Richtfest* when the roof has been put on a new building, members of Germany's Air Force, architects, contractors and workmen recently celebrated the partial completion of the Air Ministry building. One thousand rooms are ready for occupation, and another thousand have yet to be completed.



SHINING BLADES FOR NORWAY: Three of a batch of four Panther-engined A.W. Scimitar fighters which is soon to be delivered to Norway. The Norwegian Government has secured the licence to build further machines of this type. (Flight photograph.)

Swan Song

It has been announced by the U.S. Army Air Corps that no more Liberty 12 engines will be overhauled or repaired for use in Army machines. The first engine of the type was completed in July, 1917.

State Recognition

The Legion of Honour has been conferred upon M. Henri Mignet, presumably for his work in connection with the development of the *Pou*.

Hughes Seeks Fresh Fields

When his 1,000 h.p. racing monoplane has been overhauled, Howard Hughes will attempt to lower Roscoe Turner's figures of 10 hr. 2 min. for the American trans-Continental trip. The timing results obtained during Hughes' recent attempt on the world's landplane speed record have been forwarded to the F.A.I. It is believed that the average figure is in the neighbourhood of 352 m.p.h.

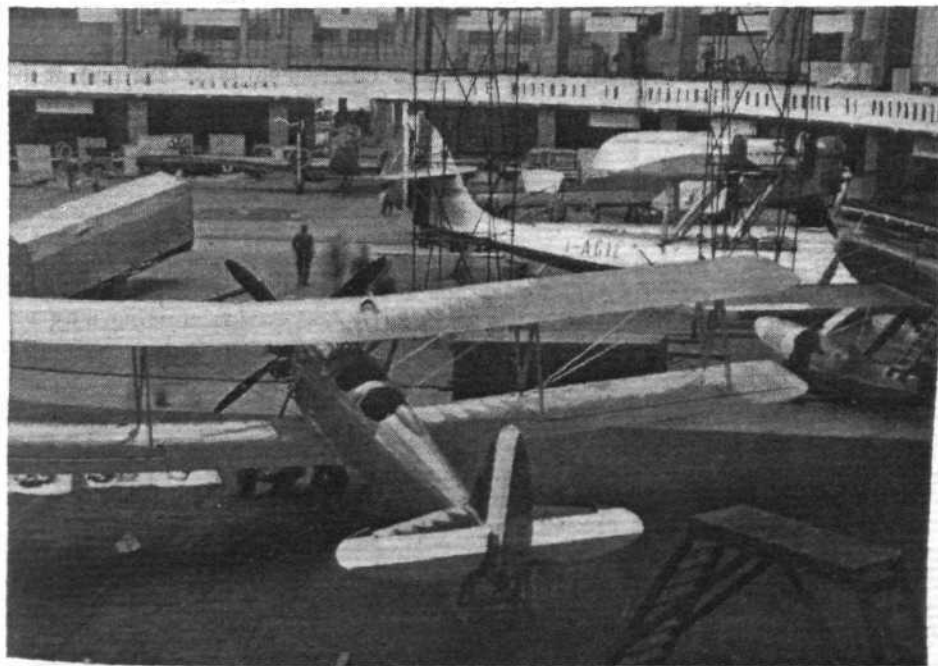
Sky Severing

Accompanied by his pet spaniel, which rode in the baggage compartment, Major Alexander P. de Seversky recently broke the world's speed record for amphibians. He was flying one of his own products fitted with a 750 h.p. Wright Cyclone radial, and attained an average of 230.03 m.p.h., his fastest circuit of the course, which was flown four times, being 236 m.p.h. Previously the record was held by a Grumman.

Twenty-five Years Ago

(From "Flight" of October 15, 1910)

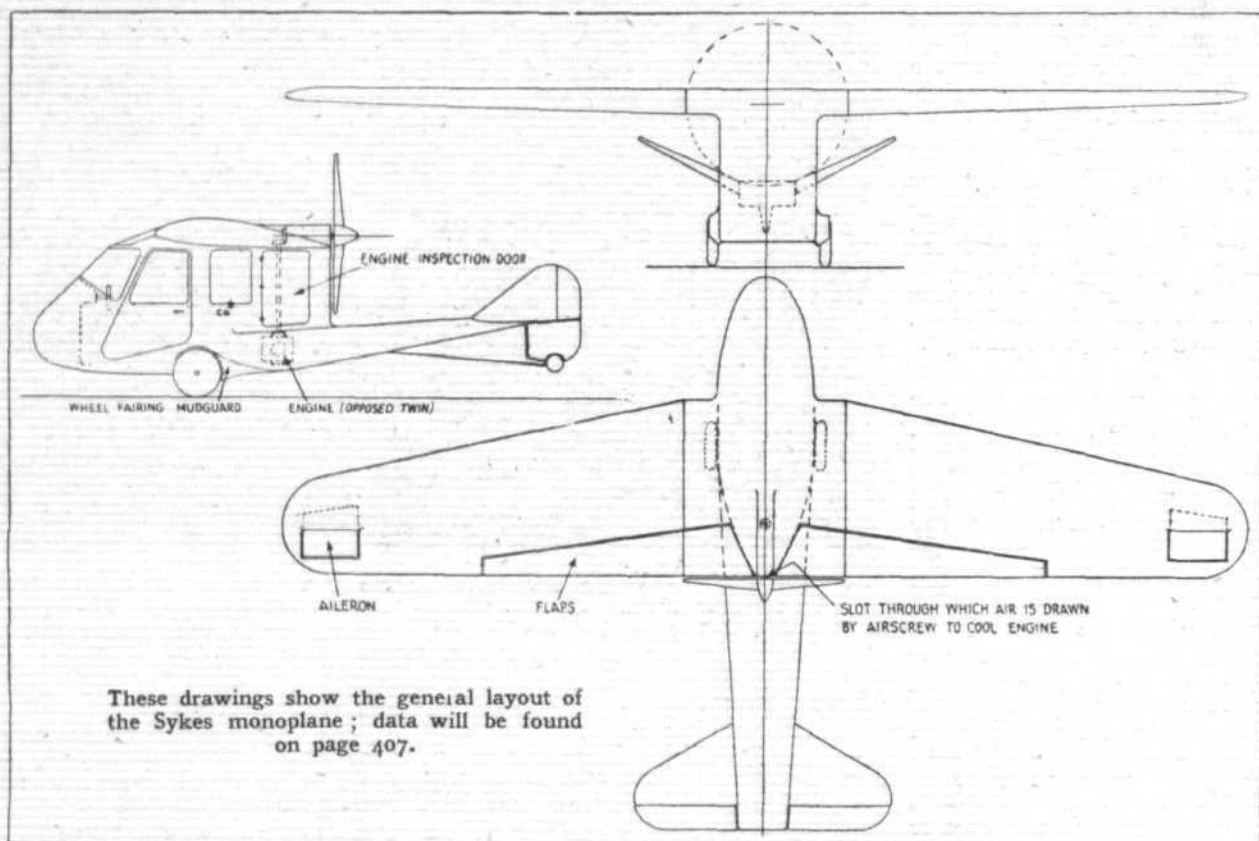
'A new racing biplane is being constructed by the Wright brothers . . . it is announced that the speed of the machine will be between 55 and 60 m.p.h., but it is believed that the designed speed is actually between 70 and 80 m.p.h.'



RECORD BREAKERS ON SHOW: Among the exhibits at the Milan International Aircraft Exhibition, which opened on October 12, are the Macchi-Castoldi which did 440.67 m.p.h., the Cant. 501 seaplane which recently flew 3,104 miles non-stop, and what appears to be a two-seater version of the Caproni biplane which holds the altitude record. The monoplane in the background is the new Potez light transport.

IS this the PRIVATE OWNER'S IDEAL?

Present-day Light Aircraft Leave Much to be Desired, Maintains Norman Sykes, Who Has Laid Out an Unorthodox Pusher Monoplane on Saloon Car Lines



IT is safe to prophesy that the aeroplane will ultimately become as popular with the general public as is the present motor car, yet, in spite of the growing interest in flying, no design anticipating the needs of the ordinary man has been forthcoming.

We find over-powered, expensive craft on one hand and under-powered toys on the other. Many are biplanes involving rigging and small parts demanding detailed inspection. The cantilever monoplanes are mostly of the low-wing type—which is, and always will be, an abomination.

The tractor is favoured by designers, since it involves the least amount of thought and suits the radial engine—a type produced with crippling monotony. Thereby the engine is literally and figuratively given first place whilst the navigator must make the best of a back seat—as if a bird's eyes and brain were in its lumbar region!

To guide us in the design of a popular aircraft, surely there are lessons to be learned from the motor car, which was born and has developed to a peak of popularity within living memory. The present light aircraft are entered by the awkward climbing of persons in fearsome apparel, which reminds one of the bucket-seater cars of about 1905.

Twenty-five years brought the universally popular saloon car with its low doors and comfort. Then let us short-circuit this long development by adopting the low saloon body for our aircraft.

Someone is sure to argue that a motor car engine is in front of the pilot. This may be a safety factor on the road where collision is likely, and one does not need to see downward. Engine inertia will not save you in an air collision, which, fortunately, need not occur if the pilot's view is good.

Many years of patient scheming have produced the design here illustrated, which conforms with most of the desiderata so far as our present knowledge permits.

To gain the motorist's confidence (and cheque) it is necessary to make him feel "at home" in his new craft. He steps through the usual ample doorway into the usual front seat of a saloon, is confronted by the usual hand-wheel, dashboard, and windscreen.

He uses the wheel for turning either on the ground or in the air. The throttle can be under his foot, but with means for locking it down, since it can be left for long periods. The door has a sliding window, the usual hand brake operates the air brakes, and engine starting may be either electric or by kick-starter from the seat.

The "Pitching Control"

The pitching control will be new to him, and is operated by sliding the handwheel forward or backward. A friction device will allow this movement to be locked when trim has been found at any speed.

The ground angle has been limited to about 4 deg., that is, with 4 deg. fixed wing incidence the aircraft on the ground is in the attitude of best climb, and may be flown off without use of the elevators, the thrust moment relieving the tail wheel of most of its load. Take-off at dangerously low speed is thus prevented.

For landing, the extra incidence given by the flaps plus the increased angle of descent due to their drag allows sufficient incidence for slow landing.

The perfect view and air brakes thus remove the need for long and costly tuition at present essential.

Regarding the power unit, I am ashamed to say there

are no suitable engines in production in this country, but they may be obtained abroad.

To most of our experts with their 1916 minds, the inclusion of a shaft drive may seem terrifying, but all cars and motor boats have one, and on the recent Westland fighter the geared shaft drive has functioned excellently. (There will be no great improvement in aircraft design until the engines and airscrews are separated.)

The advantages of placing the engine in the position shown will be apparent to all. The C.G. is lowered to such an extent that the wheels (independent units) may safely be placed on the cabin sides and faired thereto. There is no danger in a mild crash of injury to the passengers, and the overturning moment is considerably reduced.

It is hoped totally to enclose an air-cooled engine by providing a suction slot in the vertical trailing edge of the cabin. This will maintain a draught on the ground, whilst adjustable louvres or scoops will augment the airflow during flight.

Fuel may be carried in the wing shoulders, in the wheel fairings, or under the rear seat. A bulkhead behind the rear seat serves for transverse stiffness and for fireproofing.

In the ailerons an attempt is shown to reduce the wing twist by insetting them. It is hoped so to combine yaw with rolling moment that turning in flight can be accomplished by the hand wheel only.

Regarding the tail unit, the design is amended to leave a clear outflow for the slipstream and to ensure "unblanketed" fin surfaces under spinning conditions. The inclined tail planes give an upload when yawed which will tend to decrease the incidence during a spin, and may even prevent it. The ailerons and tail unit, however, are details, and the orthodox type can be fitted if necessary.

For simplicity of construction and ease of calculation cantilever principles have been employed throughout. In the cabin, for example, the cantilever pillars connecting wheels and wing allow maximum space for doors and windows.

The wing is preferably monospar, the overhang portions being detachable at the shoulders for ease of manufacture and storage. (Wing-folding can be arranged.)

The cabin has ample roominess, being three feet wide; that is, the rear seat may hold one adult or two youngsters.

It is possible to enlarge the whole design to carry four persons and baggage.

The body aft of the airscrew is hinged and detachable for ease of storage and inspection; also, large doors are fitted to the engine room.

Finally, the airscrew is placed where there is least chance of injury either to itself or to a rather careless public.

SOME CRITICISMS

By the Editor

AIRCRAFT of the same general type as that suggested by Mr. Sykes are no novelty. Very shortly after the war one of the great American firms, the Curtiss Company, if we are not mistaken, introduced a "motor car with wings." Nothing ever came of it, and we are not even certain that the contraption ever flew. On the continent, also, the idea of the flying motor car has intrigued professional and amateur designers, but the fact remains that none of these schemes has reached the production stage.

In the Sykes design there is evident a considerable familiarity with practical aircraft design, and the general scheme appears to have possibilities, but it would be idle to pretend that there is no ground for criticism.

For example, if one looks at the side elevation, and if one accepts the designer's estimate of the position of the centre of gravity, it is fairly obvious that directional stability is likely to be very poor. The amount of "fin surface" ahead of the c.g. is very large, and at the tail the designer introduces little to counteract it except a couple of sloping tail-planes. There is little doubt that the machine might easily develop what, in the very early days of flying, Professor

SYKES MONOPLANE

Weights	
TARE WEIGHT	470 lb.
TWO PERSONS	320 "
FUEL (6.5 GALL.)	50 "
OIL (1 GALL.)	10 "
TOTAL WEIGHT	850 lb.
Areas and Loadings	
SPAN	30ft. 0in.
LENGTH	17ft. 0in.
HEIGHT	5ft. 6in.
WHEEL TRACK	3ft. 6in.
WING AREA	128sq. ft.
MAX. CHORD	5ft. 6in.
WING SECTION	N.A.C.A. 2315.
WING LOADING	6.65 lb./sq. ft.
POWER LOADING	21.2 lb./h.p.
NORMAL C.P.F. FACTOR	7
AEROBATIC FACTOR, SOLO	690 lb.
NORMAL B.H.P.	40
AIRSREW DIAMETER	5ft. 0in.
Performance	
NORMAL TOP SPEED	90 m.p.h.
CLIMB AT SEA LEVEL	480ft./min.
SERVICE CEILING	11,000ft.
CLIMB TO 5,000FT.	12.5 min.
LANDING SPEED (LESS A/B)	39 m.p.h.
LANDING SPEED (WITH A/B)	33 m.p.h.
DURATION	3 hours.
RANGE	250 miles.

Lanchester termed "catastrophic instability." However, the peculiar tail arrangement suggested is not an essential feature of the design, in the sense that the good features would not necessarily be spoiled by the use of a more orthodox tail.

One is rather intrigued by the lateral control, which must probably be a feature patented by the designer. It is a little difficult to guess exactly what it is proposed to do with the very small control surfaces shown, but again there does not seem to be any logical reason why normal ailerons should not be used. They would compel a shortening of the trailing-edge flaps, but these seem unnecessarily large in any case.

In spite of the low centre of gravity position, the wheel track appears somewhat inadequate. With the amount of side area of the cabin, there would be quite a deal of "windage" on the machine in a cross wind, and at the risk of spoiling the clean appearance of the present wheel arrangement, one would like to see a wider track. Again, not an essential feature of the fundamental design.

Airscrew Transmission

Whether or not gearing to the airscrew is a good thing is open to discussion. For the sort of power contemplated by the designer there should be no great difficulty in designing a reliable transmission, but a certain amount of weight must necessarily be added thereby. In itself it is, of course, desirable both from a low drag and from a low c.g. point of view to keep the engine near the floor and the airscrew as unobstructed as possible.

The possibility of introducing a water-cooled engine is not referred to by the designer, yet the scheme of engine installation suggested seems to lend itself readily to a water-cooled unit, although it must be admitted that there might be difficulty in finding a suitable one.

The suggestion of the designer that the petrol tank might be placed under the rear seat should be strongly opposed. There are many other places where the tank could be situated, and under the seat in an enclosed cabin is just about the last place on earth for a fuel tank. Incidentally, why place the seats in tandem? Surely this is extremely illogical in a design which aims at representing motor car practice as far as possible. In a two-seater, side-by-side seating would surely be the solution, even if the wider cabin should knock a few miles off the speed.

When one comes to examine the designer's weight estimates, one feels that he has been a little optimistic. Although the machine is small, a tare weight of 470 lb. would scarcely be attainable, especially in view of the airscrew transmission and the rear fuselage "box" which carries the tail, and which must be very substantially built if it is to take care of tail wheel shocks, and of the tail surface loads.

Finally, it would be interesting to know upon what Mr. Sykes bases his sweeping condemnation of the low-wing monoplane. The type has numerous practical advantages, and now that the effect of wing-root fillets is known, it is certainly not inferior, aerodynamically, to any other type.

Private Flying



Topics of the Day

Back to Front

LAST week I was discussing the modern light aeroplane with a one-time pilot who, apart from the occasional use of air services for business purposes, has taken very little interest in flying during the past eighteen years. He asked, naturally enough, why it was that the pusher type had never made any headway, and I was only able to give him some very poor answers, for the simple reason that I have been asking myself the same question since the day when I made my first instructional flight.

On that flight my greatest difficulty was not concerned with the mere business of keeping straight and level, but in finding the aerodrome again after it had been lost behind an apparently impenetrable mass of wings, wires, struts and engine. Only the absolute newcomer realised the full extent of the obstructions to a pilot's view in that particular and otherwise excellent aeroplane. After a few hours I learnt where to look and discovered that quite a number of the more important sections of the outside world were in restricted view.

Nevertheless, on my second or third solo flight, while practising gliding turns on the way into the aerodrome, I came within measurable distance of colliding with an Auxiliary Air Force machine. The memory of the sudden, sky-filling appearance of the complete underworks of a Liberty Nine in a vertical turn remains with me still. I like to see where I'm going and, consequently, I like the pusher.

The Pusher Type

THE man with whom I was discussing these things had a very particular reason for being "pusher conscious," inasmuch as he had never flown anything else. In the midst of a more or less violent condemnation of the general inadequacy of the flying qualities of the war-time pushers in which he was forced to perch himself, he managed to give me the impression that he liked flying them and that he never considered the possible results of a nose-over.

From this last I gathered that such things were neither unusually common nor necessarily more fatal than in the case of a tractor machine. Few war-time pilots can resist the temptation to explain, in graphic detail, the quite civilian risks that were run in the machines of that period. More than once I have been regaled with fine descriptive sentences setting forth the almost consistently fatal characteristics of a certain much-used scout—each narrator winding up with the remark that it was the "loveliest little aeroplane." Presumably, all those who thought otherwise did not survive to give their impressions.

There is no reason why, with the airscrew out of harm's way, a pusher's undercarriage should not be made so that a nose-over would be an absolute impossibility. In any

case, it is the airscrew in a normal machine which finally acts as a sprag in the circumstances which might precipitate such accidents—and these are rare enough to be ignored while considering the merits of the type.

Flying at its Best

NO one who has flown as pilot or assistant pilot in the nose of a modern commercial machine can deny that the completely hemispherical range of view in essential directions is anything but magnificent. The pilot can not only see where he is going without breaking his neck, but he can also appreciate to the full the considerable scenic beauties provided for the lucky aeronaut.

In the type of pusher machine which might be designed for the owner-pilot the rearward view in important directions should be almost as good as that obtained by the pilot of any conventional biplane and a great deal better than that in many cabin machines.

There being no swirling slipstream, careful windscreen design would allow what might eventually be described by the imaginary makers as "cabin comfort with the sense of freedom and safety obtainable only in an open cockpit machine." I know at least one private owner who uses his machine for relaxation only and will not tolerate the idea of a cabin machine even though he is rather tired of his own obsolescent biplane.

Expanding the Market

MANY of the advantages offered by the type of pusher machine that I have in mind will have been discovered by anyone who has flown the B.A.C. Drone or Super Drone. The flying speed is low as flying speeds go nowadays, but whereas sixty miles an hour in an open car is a draughty speed, in the Drone one hardly notices the wind, and goggles are entirely unnecessary. Any really fast pusher with an eddy-free nose and a properly designed windscreen should be just as comfortable, though there is, of course, no reason why the machine should not be of the conservatory cabin type with a sliding roof and sliding windows.

Apart from the amazingly good view obtained from such a machine as the Drone—at slow speeds the effect is almost that of sitting in a new kind of balloon gondola—the noise and any vibration of the engine pass unnoticed for the simple psychological reason that the power unit is out of sight and out of mind. A luxurious pusher might reasonably be expected to have a smooth and properly silenced engine so that the pilot would receive an even greater impression of detachment.

I am firmly convinced that a machine on these lines would help to expand the ridiculously small present market for private aeroplanes.

INDICATOR.

FROM the CLUBS

Events and Activity at the Clubs and Schools

CASTLE BROMWICH

Last week, during which flying times were 18 hr. 35 min. dual and 13 hr. 50 min. solo, Mr. A. J. Holloway became a flying member and Miss B. Briggs went solo.

LONDON

Needless to say, the Hornet Moth, which was recently added to the club's fleet, is experiencing great popularity. In spite of last week's weather, 52 hr. 55 min. flying was done and Capt. Carbutt completed the tests for his "A" licence.

BRISTOL

It has been decided that night flying instruction shall be available on any night provided that a minimum of 90 minutes' flying is booked beforehand. The winter programme, for the club has been arranged and includes lectures to local organisations as well as to club members.

It is probable that the club Aviation Ball will be held next February.

Mr. W. H. Hicks has completed his "A" licence tests.

HAMPSHIRE

High winds and rain caused a drop in flying times for September; the final figure was 171 hr. 55 min.

Miss K. Worrall, Capt. J. M. Ryan, Mr. H. R. Carver and Mr. A. E. Broomfield became members during the month, and Mr. G. Verdon-Roe went solo.

Three pupils qualified for their "A" licences—Miss D. E. Abrams, Mr. A. H. Lee and Mr. G. S. Meek.

The tenth annual Dinner and Dance will be held at the South Western Hotel, Southampton, on December 6.

YORK COUNTY

The Duke of Gloucester used the aerodrome when returning to his regiment at Catterick a little while ago.

The club regrets the loss of two flying instructors—Willy Wilson and Jock Primrose—to Hanworth. Mr. Alexander has become a new instructor, and Messrs. Hartley, Ingham, King Clark, Liversedge, Lawson-Smith, Rous and Leyfield have joined as flying members. There are, in addition, five new associate members. The following have gone solo recently—Miss Blackwell and Messrs. Stanley, Silvester, Clegg, Taylor, Walker, Usalis, Hughes, Wynn-Edwards, Tyson, Heath, Sutcliffe-Smith, Evans and Tuck. Tests for the "A" licence were completed by Messrs. Tetley, Foster, Heath, Mason, Evans, Sagar, Hughes, Tuck and Tyson during the last three months.

A short cross-country and navigation competition is being arranged for the morning of Sunday, October 27.

READING

Mr. Thomas (an Air League Young Pilots' scheme pupil) and Mr. Billing have become pupils, and Mr. C. G. Bennett has qualified for his "A" licence.

BROOKLANDS

Viscount Forbes and Miss P. Duncan obtained their "A" licences last week, and first solos were made by Mrs. Peyton, Miss D. Kay and Mr. Dudley Froy, the racing motorist. Mr. Froy, incidentally, received only 2½ hours' instruction.

A tea dance will be held at the club next Sunday.

HANWORTH

Mr. W. Kenyon passed the tests for his "A" licence last week and first solos were made by Messrs. Hoppe and Prosser. Messrs. Jones and Silling became members. Flying times last week totalled 36 hr. 10 min.

A dinner-dance will be held at the Hanworth Country Club on October 26.

HESTON

"A" licences were applied for last week in the names of Mr. J. C. Day and Mr. J. P. Gorman, the latter a Sudan Government official. Mr. Gorman learned to fly in a great hurry while on leave, and has already returned to duty, leaving instructions for his licence to be forwarded to him when it is received.

The weather has been much as usual—that is, not so good. There is a perceptible increase in school bookings as people come back to London from their holidays.

The Hornet Moth is giving demonstration flights every day and several pupils of the school have taken instruction on it—a facility which can always be arranged on request.

AIR SERVICE TRAINING

The twenty-seven R.A.F. *ab initio* pupils to arrive at the school on August 6 left on September 30. Five of these went to Cranwell for Service training prior to receiving permanent commissions, and the remainder proceeded to R.A.F. Flying Training Schools.

The new Civilian Term opened on September 3 with the arrival of sixteen students. Of these, twelve are English, and there is one each from South Africa, Holland, Finland and Japan.

Capt. Hutchinson, Mr. Malling, of Norway, Señor Belmonte, from Spain, and Messrs. Breeze and Hawkins completed various courses and left during the month. Mr. R. Martin, on the completion of the short wireless course, secured a post as wireless operator with Imperial Airways.

The Gardner Flying Trophy (presented by an ex-student, Mr. C. E. Gardner, who carried off the Siddeley Trophy in this year's King's Cup Race) was won by Mr. D. Raubenheimir, of South Africa, who was closely followed by Mr. Birchenough.



UP AND UP: In view of the fact that the Aeronca is now being built in this country this picture of a seaplane version which broke the height record for light seaplanes is of particular interest. Mr. B. King, the pilot, reached 16,000 ft. in 2 hrs. 20 min.

Private Flying

REDHILL

The Redhill Flying Club flew 44 hr. 15 min. during the week ended October 11, and Mr. T. Puckle passed his "A" licence tests. Another blind flying certificate was obtained, and three new members joined the club. The wireless school has now started its winter term.

C.A.S.C.

Over the week-end the Civil Aviation Service Corps flew 5 hr. 40 min. dual, and 1 hr. 5 min. solo. During the interval the framework of the new hangar was being put up. Mr. E. W. Grey has started a winter series of lectures on various subjects connected with aviation. The first dealt with instruments.

CAMBRIDGE

An improvement in the weather last Sunday week permitted 16½ hr. flying on that day, and on the Monday 13 hr. more were recorded. Unfortunately, the promise of the early part of the week was not fulfilled, and the total flying time for the week amounted to only 36 hr.

Viscount Forbes and Messrs. Don Johnson and Parkhouse became members.

HERTS AND ESSEX

There was a decrease in flying times at the Herts and Essex Club during the fortnight ended October 9 owing to prevalence of fog and rain. Actually, 125 hr. 25 min. were flown. Six new members joined, and first solos were made by Messrs. T. A. Cox, L. Tomas, H. J. Sparrow and W. T. Tracey.

The bad weather caused the temporary cancellation of the Janet Lady Brickwood Challenge Cup, which will be competed for next Sunday. A B.A. Swallow is now available for members' use.

NORFOLK AND NORWICH

During last week-end the Flying Committee arranged a cross-country competition for the President's Trophy, which has been won on two previous occasions by Mr. A. R. Colman. This year there were more entrants than usual, and for the first time the trophy was won by a lady pilot—Mrs. F. Crossley, who obtained full marks. Mr. Colman was second and Mr. M. E. King third. At the end of the flight Capt. Collier judged the competitors' landings.

On Saturday evening Mr. S. S. Stevenson gave a talk to the 21st Norwich Rover Scouts at their headquarters. Two new pupils have joined the club.

CINQUE PORTS

Many people passed through Lympe during last week and among them were Flt. Lt. David Llewellyn and Mrs. Wyndham in their Hendy Heck. The motor developed trouble near Lyons, so they returned to Lympe, where it was duly rectified. They continued their journey to Hanworth. Mr. "Bill" Thorne lunched at the club on the way to Athens and the Bata Aero 35 (Walter motor) landed after sunset with many samples of shoes aboard. The next day one of their Spartan "Cruisers" came in with a similar freight.

Miss Jean Batten came down from Gravesend on Friday in her new Gipsy Six Gull. It is understood that she contemplates starting her South Atlantic flight from Lympe. M. Provost brought his new Leopard over from Ostend and had the engine thoroughly overhauled.

Mr. H. E. Oakshott is a new flying member, while Mr. Ted Fynn and Miss Creina Constant have both taken "A" licences. Flying time for the week ended last Thursday totalled 48 hr.

The first of the winter season's aviation dances will be held on Friday next at the Leas Cliff Hall at 22.00 hr. There will be demonstrations of the Aeronca Jap at the week-end.

HERE and THERE

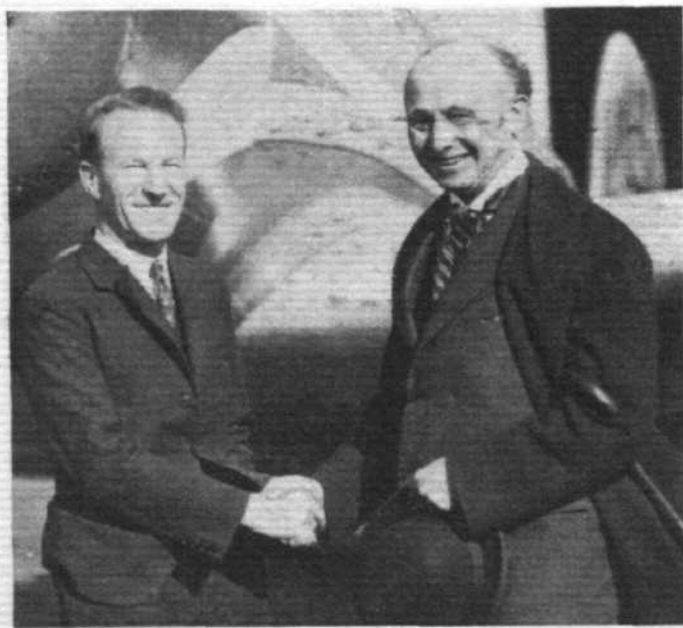
G.A.P.A.N. Lectures

The winter series of the G.A.P.A.N. lectures for the Second-class Navigators' Examination will begin on Tuesday, November 5, and will be held during the winter months in London on Tuesday and Thursday evenings.

The fee for the course of about forty lectures (including meteorology and signalling) is five guineas for members and six guineas for non-members, which includes the use of maps, charts, and equipment.

A complete set of books covering all subjects can be obtained on loan from the Guild.

As the class and sets of books are limited and several applications have already been received, it is advisable for those wishing to join to apply at once to the Clerk, 61, Cheapside, London, E.C.2.



H.E.C.A.N.T. To comply with I.C.A.N. requirements Sir Charles Kingsford Smith will only be able to carry fuel on his Australia flight sufficient for less than half the range of which his Altair, *Lady Southern Cross*, is capable with full tanks. Up to last Tuesday he was still trying to find a way out of the difficulty. Here Sir Charles is seen greeting Mr. Wilson Cross, Chairman of the Vacuum Oil Company, at Croydon.

Little America

ROLLASON AIRCRAFT SERVICES will be a name to conjure with in the U.S.A. if things go on as they are doing. First they handled the Bellanca *Irish Swoop*, then Mrs. Mollison's Beechcraft and the new Stinson Reliants. Now they have taken on Sir Charles Kingsford Smith's Lockheed Altair.

Rollason's unshipped the aeroplane on to two barges at Millwall Docks and floated it down to All Hallows, Isle of Grain. After waiting some hours for high tide the barges were pulled ashore and anchored. When the tide receded the barges were high and dry, and planks were used to run the aeroplane ashore across pebbles and into a field which gave a run of 300 yards.

Automatic Navigation

A MARTIN Bomber, equipped with a Sperry automatic pilot and the Kreusi radio compass which has been developed by the Army Air Corps, has now been flown with additional apparatus which combines these devices. It is only necessary to tune in to a radio station at the destination and, after adjustment, the machine will fly itself there.

The stations used in the tests were Cincinnati and Dayton (WSMK and WHIO). When the Martin reached one station under automatic navigation the other was tuned in and the big bomber slowly turned and headed for its new destination.

The flights, carried out by Maj. C. J. Crane, have aroused a great deal of interest. The connecting device which he uses to combine the automatic pilot with the Kreusi compass is a sensitive device which picks off the compass indications and, by means of relays, sets the pilot.

The Brussels Mishap

EVERYBODY commiserated with Capt. Wilcockson, whose ill-luck it was to be in command of *Syrinx* when she was blown over during the Brussels hurricane. It really was official hurricane weather, for Brussels showed a wind of about 120 km.p.h., and Flushing registered 120 km.p.h., and then apologised because this was too high for the instruments.

When "Wilkie" returned to Croydon he was met by a deputation of fellow pilots who presented him with a medal the size of a soup plate suitably, if scurrilously, inscribed, and ribbon being of aeroplane fabric and the pin one of those used for aeroplanes—gargantuan safety-pin style. It showed that we have not lost our sense of humour, anyway. Quite a lot of fun was also obtained by warmly inviting Capt. Wilcockson's first officer, Mr. Woodhouse, to take a seat, he having suffered from a splinter of glass in such a way that standing bolt upright became, temporarily, his favourite position.

Full marks are due to Mr. Leonard Inghams, a passenger aboard *Syrinx*, who flew to London from Brussels by Sabena a few hours after the accident.

INITIATION

*Another Episode in the Not-too-serious
Tale of a Newly Commissioned R.A.F.
Officer's Daily Existence*

By Ex-Pilot Officer F. W. RICHARDS

"**H**ERE is your batman, who will show you your room, and there is the mess; come over to it when you have finished your unpacking." The officer who had given me this information himself retired hastily in the direction of the mess to refresh himself after delivering the batch of newly joined Acting P/O.s, including myself, who had just arrived at Uxbridge.

I followed the batman to my room, watched him unpack, told him that I did not require anything else, and proceeded to spend half an hour brushing my hair to make certain that I would not be the first "new boy" to enter the mess and thus find myself in solitary and unbearable embarrassment in a huge room full of very important-looking officers.

Newly joined officers, I had learned, were sent to Uxbridge for a fortnight, so that they could obtain their uniforms in London conveniently, under official guidance, and so that they could learn enough Service etiquette, convention and drill to prevent them making abject idiots of themselves when they reached their F.T.S.

I learnt the drill from a warrant officer who possessed all the command of the English language with which the humorists credit them, and, considering that, as officers, we were not treated to the full amount of which he was capable, I shudder to think of the heights of vitriolic rhetoric he might have attained given full licence.

Driving it Home

The etiquette and convention were given to us in lectures by Flt. Lt. T—, who embellished his facts with a wealth of past experience, supplied partly by his Service life and partly by the most vivid imagination I have ever met. His greatest joy in life was to warn us against low flying; then, and only then, were his inventive powers allowed full scope, and under their guidance the machines he had flown in the past, with himself at the controls, performed the most miraculous feats of daring, while his audience sat wrapped in admiration, and longing for the day when they, too, would swoop between trees, under bridges, and land on roads.

When my fortnight had expired I was sent with a batch of thirty others by the slowest train of the day to No. 2 F.T.S.

The journey to Digby terminated by a drive of some ten miles in the most iniquitous vehicle of proportions which were absurdly large considering the number of its passengers; its tyres were much too hard, its seats were not designed for the posteriors of human beings, and at



the wheel sat an airman with pronounced suicidal tendencies and none of the finer feelings which I felt he should bring to bear on the racked anatomies of his passengers. For two pins and another mile I would have resigned my commission there and then.

Aching in every limb, we staggered from the transport to the mess, where we were received by two A.P.O.s who had been at Digby for over six months and were therefore in their second "term." They had been detailed to stay in over the week-end to greet us, and told us so rather forcibly. They showed us our rooms and retired to play tennis, leaving us to our own devices.

On Monday we saw the C.O., and were then divided into two squads so that half of us flew while the others were receiving a lecture, thus avoiding the horrible consequences of having thirty untrained pilots all in the sky at the same time, or, alternatively, thirty bodies all asleep in the same lecture room.

An F.T.S., I discovered, is a cross between a school and a university. The discipline is very strict, and you are never allowed to forget that you are still only an Acting P/O. and can be relieved of your commission at any moment. But this is rather necessary, since, for example, an inexperienced pilot who has thrown a party lasting until the small hours is a menace of considerable proportions when he flies later in the morning.

The year spent at F.T.S. is divided into two "terms," junior and senior, each lasting six months, with a break of a month's leave in between. There are exams. at the end of each term, and although I may say with perfect truth that I have never been successful in a single examination outside the R.A.F., and am never likely to be, I passed these quite easily.

The Chief Ground Instructor, who headed the little band of instructors who coped with the pupils when they were on the ground, rejoiced unofficially in the name of "Happy," and he contrived by some miraculous means to keep me in the Service whilst I was at Digby, so that I could leave at the end of my senior term secure in the knowledge that I had completed the least pleasant period of my R.A.F. career and could pass on to the less confined days of squadron life.

ENGLAND'S FIRST "POU" CLUB

THE Leicestershire Flying Pou Club was formed, with fifty enthusiastic members, in Leicester on October 9. Prime movers in the venture are Mr. Victor H. Doree, a former member of the London Aeroplane Club, and a pilot with 1,000 hours on his log book, and Mr. Leonard Harries, whose lack of experience as a pilot is countered by an amazing keenness to build Poux and yet more Poux.

For the time being the membership is limited to fifty. With the subscription at £2 2s. a time the club will have £100,

which, it is considered, should be ample to give the first Pou its first hop, especially as they have had the offer, gratefully accepted, of an almost complete fuselage, built by a local handyman. The club has also been granted the use of a field and sheds at Belton, thirteen miles from the city, and a fully equipped workshop in Leicester itself, where the Leicestershire Pou and its successors will be made.

When the first machine has been built and flown successfully batches of about twenty new members will be admitted to take part in the construction of a second machine.



¹¹⁹⁹⁴⁵
A GAIN this week *Flight* is able to reproduce a remarkable series of aerial photographs of an interesting new type of military aircraft, this time the Armstrong Whitworth A.W.XXIII bomber transport, built for the Air Ministry in competition with contemporary types. The primary considerations in the design are the carriage of troops, stores, spare engines and other items of equipment, but the machine can also be used as a straightforward long-range heavy bomber.

As the photographs clearly show, the aerodynamic design is extremely "clean," all drag-producing excrescences having been reduced to a minimum and a retractable undercarriage being fitted, while bombs are carried internally. So successfully has this been done that the performance is comparable with that of the latest American twin-engined transport machines. The engines are two 760/810 h.p. Siddeley Tiger VI fourteen-cylinder two-row radials enclosed in the latest type of Siddeley long-chord cowlings. The span of the machine is 88 ft. and the length 80 ft. 9 in.

The A.W.XXIII was flown by F/O. A. C. Campbell-Orde, A.F.C., for *Flight's* chief photographer, John Yoxall, who secured the accompanying pictures from a Hawker Hart Trainer, piloted by Flt. Lt. C. K. Turner-Hughes. In one of the accompanying photographs both pilots are seen at "upstairs windows" of the A.W.XXIII.

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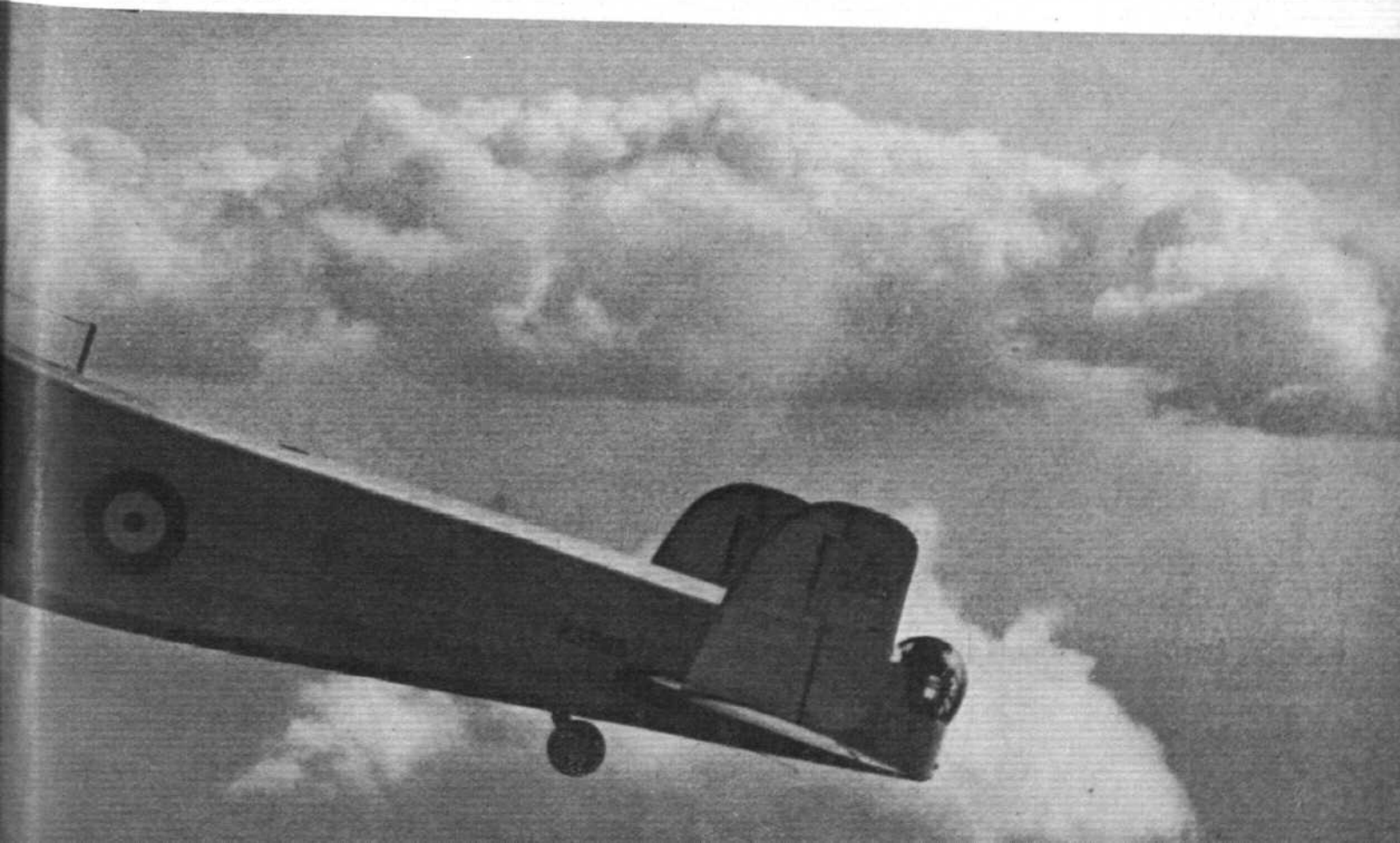
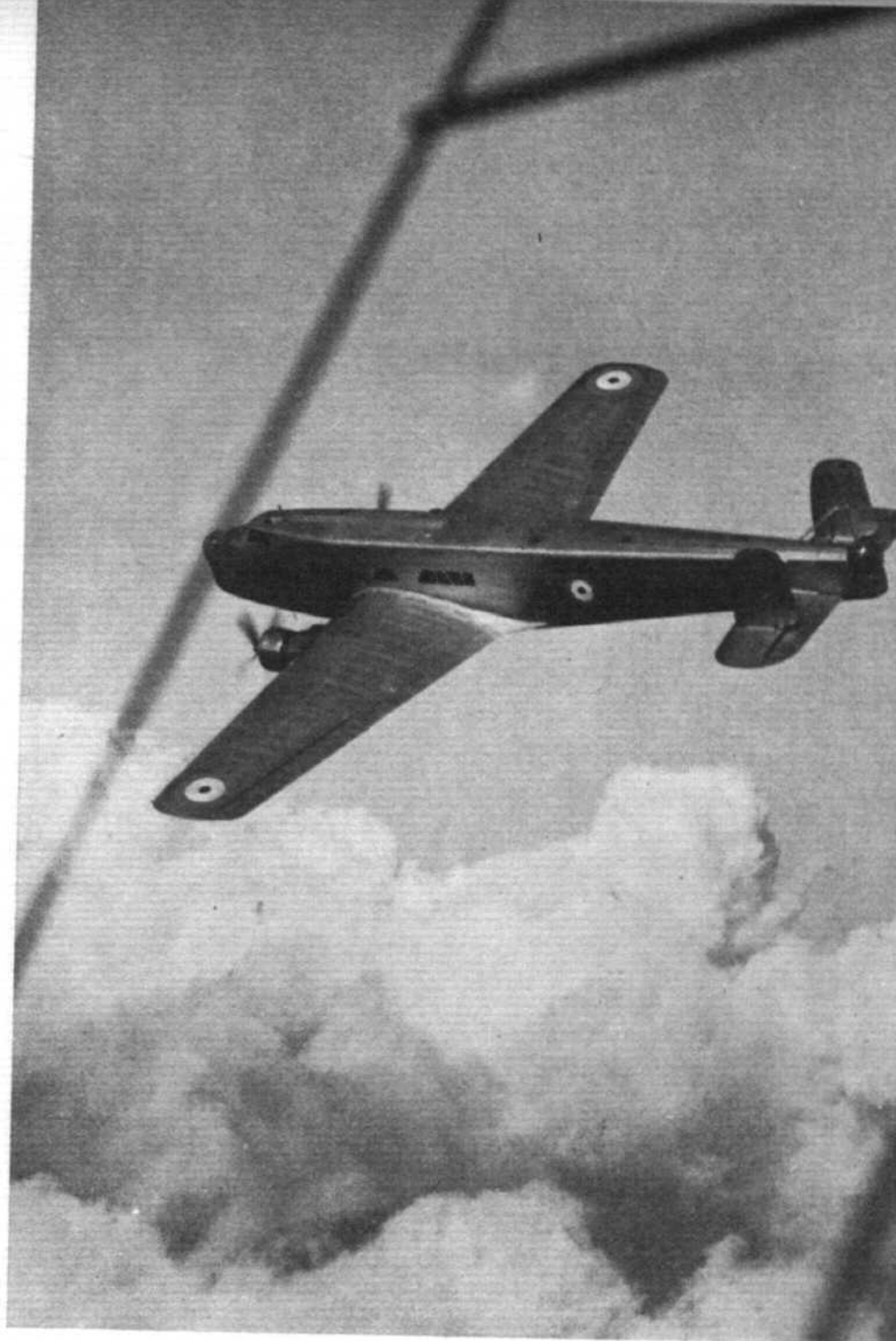
FLIGHT, OCTOBER 17, 1935.

A.W.XXIII

Another Notable Series of "Flight" Photographs : The High-speed Bomber Transport (Two Siddeley Tiger VI engines) Produced by Armstrong Whitworth



12001



HAS the "POU" a FUTURE?

An Interested Observer Begs to Cast a Doubt

By W. BODDY



AS an outsider who is *not* contemplating the construction of a baby flying machine in the spare bedroom, I am, nevertheless, keenly interested in the future of the *Pou*. Or, rather, I find myself wondering if it has a future.

There are several questions that I, as a rather ignorant outsider, feel prompted to put to these enthusiastic young men who are hard at work creating *Poux* in the image of M. Mignet's original.

Some of M. Mignet's followers, of course, are not in any way concerned as to whether the *Pou* has a future or not. Aviation is their hobby, and they are building a new kind of light aeroplane of standardised design with which to get into the air. If the cost of building the *Pou*, of insuring the *Pou*, possibly rebuilding the *Pou* crashed in learning to fly, and, ultimately, the restrictions placed upon the completed *Pou*, do not diminish their initial enthusiasm, all well and good.

Appeal of the "Pou"

But others of Mignet's disciples would have us believe that the Sky Louse is leading the way towards a new era of private flying. It is then that I want to start questioning, suggesting that *Pou*-building is but a passing craze. . . .

We have been told that the *Pou* will entice large numbers of new pilots into the air. But will it? Setting aside those aviation enthusiasts who are creating *Poux* for the fun of the thing, these low-power machines are claimed to attract two classes of person: (a) present non-flyers, such as the more sporting motorists; (b) those licensed pilots who cannot afford to own existing light aeroplanes of 130-200 h.p.

Now, what reasons are there for imagining that sporting motorists in any great number will be attracted by the *Pou*? What of the restrictions governing the C. of A.-less *Pou*? To me £150 or so seems quite a lot of money to

exchange for the doubtful pleasure of flying round and round a field on fine days in a solo machine. Apart from that, isn't it asking quite a lot of even a skilful motorist to expect him to climb into a single-seater *Pou* and then feel his way into the air? Granted that the Sky Louse may be easier to handle than a normal aileron-fitted small aeroplane, and that straight "hops" may be simplicity itself, the thought that sooner or later *two* turns will have to be mastered in one flight if one is to take-off and land into wind in the conventional manner is a trifle startling.

No doubt private flying is due to expand enormously. But that expansion will only commence when light two- and three-seater aeroplanes are available, capable of getting about at twice the average speed of a good sports car, for about the same running costs. Even then the boom will not get going in earnest until instruction is cheaper, the art of navigation is considerably simplified, and aerodromes provided adjacent to those resorts, towns and sporting centres to which private flyers will wish to fly. When these conditions will come about I have no idea, but I am certain that the *Pou* can only play an infinitesimal part, if that, in the furtherance of private everyday flying.

What of the second class of possible *Pou* purchasers? Certainly we have a potential market here that should keep quite a few *Pou*-dealing concerns in business for some time. I reckon it out thus: There are just over 3,200 "A" licence holders in this country. There are roughly 450 privately owned aeroplanes, which leaves 2,750 licensed pilots not flying machines of their own. As I have ignored "B" licence holders, and those who own more than one aeroplane, the figure is reassuring. Of this 2,750, some will have done no flying after getting their "tickets," and others will only fly if to do so helps them earn their daily bread-and-butter. But the majority of these persons who have learned to fly are obviously getting into the air as and when they can in aeroplanes hired from the flying

clubs. Most of them fly this way because the conventional light aeroplane, costing upwards of £600, and consuming five gallons of fuel an hour, etc., is too expensive for them.

That, say M. Mignet's patrons, is where the *Pou* comes in. But does it? Granted an isolated number of these would-be owner-pilots may put the pennies formerly spent on club-hire towards the construction of a *Pou*. But they will be the sort of persons who enjoy tinkering with anything mechanical, or else are so anxious to get more frequently into the air that it is immaterial whether the cruising speed be 55 or 155 m.p.h. The majority of these "A" licence holders will be very much more exacting! Used as they are to modern 130-200 h.p. aeroplanes, they will feel none too easy flying behind tiny, modified car or motor cycle engines.

I cannot overlook the fact that eight or ten horse power, applied to an airframe possessing safe take-off and landing characteristics, will not be able to better a cruising speed of about 70 m.p.h. in still air. And, obviously, this speed will drop in direct proportion to the speed of any head winds encountered. Already owner-pilots and club-hirers are getting beyond the "aerodrome to aerodrome on fine days" stage, and are flying to visit friends, to spend afternoons and week-ends on the Continent, and to participate in sporting events and flying competitions. Under these

conditions of usage a machine that cannot average around 90 m.p.h. minimum in any sort of flying weather is not worth the fuel it consumes. What place has the *Pou* in this line of argument? Even ignoring the matter of speed, will pilots accustomed to existing light aeroplanes feel at ease in a machine that demands full throttle continuously against the slightest head wind? And what of the reliability factor when flying, for example, to the Continent—assuming that anyone wants to fly that far, all by themselves, in an open cockpit? Experts paint horrible pictures of baby engines losing all their revs because a valve cracks up or the single magneto ceases to function correctly.

No, in my opinion, this potential market of 2,500 or so light aeroplane buyers is best tapped through the medium of £400 two-seater enclosed cabin machines of 30-40 h.p., which, as the Praga Air Baby and the Aeronca C.3 have indicated, can cruise at 80 m.p.h. at rather less than half the flying costs of the 130-200 h.p. type of machine. The low first cost and economy of such 30-40 h.p. aeroplanes would compensate for their lower cruising speed in the eyes of many prospective owner-pilots. And in time, when proper engines of this power became available, the market would open up considerably, as the more sporting motorists took an active interest in this form of pleasure travel. I venture to suggest that by that time the *Pou-du-Ciel* will be but a dim and distant memory.

FROM COCKPIT to CANVAS

IN the North Court of the Victoria and Albert Museum, South Kensington, the Rt. Hon. Sir Philip Cunliffe-Lister, Secretary of State for Air, last Tuesday opened the second exhibition of the Air Force Artists Association.

The number of exhibits has nearly doubled since the first exhibition of this Association, which has nearly 150 members, was held two years ago. Sculpture, Photographs, and Crafts form additional new sections.

No doubt the artists of the R.A.F. take delight in their leisure hours in running away from the familiar objects of their daily routine, yet their everyday surroundings, one would imagine, offer an endless field for artistic representation. The highly polished surfaces of cowlings in bright sunshine; Brangwynesque effects in factories and hangars; acetylene welding, or similar colourful activities of the workshops; these things find no room on the walls of the exhibition. True, there are some flying pictures, notably those of Mr. V. FitzGerald, who is in charge of the drawing section of the Air Ministry; one of his water colours, "Hawker Nimrod," was awarded a first prize. Our old friend Wing Cdr. Roderic Hill appears to have deserted his delicate water-colours for dry-point etchings,

and only one of his subjects has some slight connection with flying.

In the photographic section Mr. G. A. Clark has some fine studies of clouds which are of both artistic and scientific value.

The great majority of artists, however, derived their subjects from landscapes, flowers, portraiture, or purely decorative designs. Among these, most notable are the landscape paintings by Group Capt. H. J. F. Hunter, at present stationed at Baghdad, who was awarded first prize for one of his landscapes in oils. Besides being an accomplished artist, incidentally, he is also a champion tennis player.

Another landscape painter, Group Capt. A. C. Winter, British Air Attaché in Greece, is, unfortunately, represented by only one work; his other paintings intended for exhibition are still on the way from Greece.

The Association was fortunate in securing the services of Sir Herbert Hughes-Stanton, R.A., who consented to judge the merits of the exhibits.

The exhibition, to which admission is free, will remain open until October 26.

The Latest Electra

FIVE Lockheed Electras of the very latest model, known as the 10B, have been delivered to Eastern Air Lines, a division of North American Aviation Inc., for operation on the lines from Newark to New Orleans and from Chicago to Miami.

The machines are fitted with Wright Whirlwind 975E3 engines, with "dynamic dampers," which give a maximum speed of approximately 210 m.p.h. In its new form the Electra's all-up weight is 10,000 lb. compared with the 9,750 lb. of the previous model. Ten passengers, two pilots, and 500 lb. of baggage and cargo are carried. Innovations include de-icer equipment on the leading edges of the main plane and on the tail plane, and landing lights in the leading edge instead of in the nose of the fuselage.

Detail Refinements

Hamilton Standard adjustable-pitch airscrews are fitted, being set at the Lockheed factory for best cruising speed for the conditions under which the machines are to be operated. Western Electric transmitting and receiving apparatus is fitted, two fixed aeriels located under the fuselage being used for receiving, while a new Heintz-Kaufmann automatic reel in the tail cone controls a trailing aerial for use in transmitting.

A water cooler is installed in the cabin, and there is a lavatory at the rear of the cabin. In the nose is stowage for 250 lb. of baggage, and 125 lb. may be disposed of in each wing compartment.



SIGNAL HONOUR: Messrs. T. Campbell Black (centre) and J. G. McArthur, following their escape from the unlucky Comet by parachute, receive the gold emblem of the Caterpillar Club from Mr. Leslie Irvin, founder of this unique society.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS

THE INSPECTOR GENERAL

Air Chief Marshal Sir Robert Brooke-Popham, who is making a tour of inspection of R.A.F. Stations, has arrived in Egypt after visiting Gibraltar and Malta.

PRIZE CADETSHIPS

The Air Council have awarded Prize Cadetships to the following successful candidates at the examination held in June, 1935, for entry into the Royal Air Force College, Cranwell:—P. S. Butler, Winchester College; W. E. M. Lowry, Highgate School; J. M. N. Pike, Stowe School; J. F. Pearce, Ealing Priory School; L. D. Mavor, Aberdeen Grammar School, Aberdeen University; and E. Tennant, University College School, Hampstead.

FLIGHT CADETSHIPS FOR AIRCRAFT APPRENTICES

Ex-Aircraft Apprentices J. A. Pitcairn Hill, P. G. Wykeham-Barnes, R. T. Frogley, P. A. N. Cox, from No. 1 School of Technical Training (Apprentices), Halton, and Ex-Aircraft Apprentice P. M. Wigg, from the Electrical and Wireless School, Cranwell, have been selected for cadetships at the Royal Air Force College, Cranwell, on the result of the examination held on completion of their three years' training as aircraft apprentices.

The "Viscount Wakefield" Scholarships valued at £75 each have been awarded to Flight Cadet P. W. Dawson (as the result of the recent competitive examination for entry into the Royal Air Force College), and to Flight Cadet J. A. Pitcairn Hill. The "Hyde-Thomson Memorial Prize," valued at £29, has been awarded to Flight Cadet P. M. Wigg.

NEW AERODROMES

The new R.A.F. stations for which sites have already been selected are at Cranfield (S.W. of Bedford), Church Fenton (W. of Leeds), Debden (S.E. of Duxford), Eastburn (near Driffield), Feltwell (Norfolk), Finningley (S.E. of Doncaster), Harwell (Berks), Hemswell (Lincs), Hullavington (Wilts), Marham (Norfolk), Montrose (Scotland), Manby (Lincs), Odiham (Hants), Shawbury (near Shrewsbury), Scampton (Lincs), Stradishall (Suffolk), Tern Hill (Salop), Thorney Island, Upwood (N. of Wyton, Hunts), and Wyton (Hunts). Locations have also been fixed for new armament training camps at Chesil Beach (Dorset), Hell's Mouth (Caernarvonshire), and Luce Bay (Wigtownshire). There remain to be allocated twelve additional R.A.F. stations and three more armament training camps.

R.A.F. BENEVOLENT FUND

The fourth Council Meeting of the year was held at Iddesleigh House, on October 2. Dame Helen Gwynne-Vaughan, G.B.E., D.Sc., LL.D., the Deputy Chairman, was in the chair.

Expenditure upon relief during the period July 1 to October 1, 1935, amounted to £3,388 2s. 8d., and the total expenditure during the Council year has now reached £10,862 8s. 2d., representing an increase of £2,420 18s. 6d. over the same period in the previous year. These figures do not include either the maintenance of Vanghugh Castle School or the monthly subscription to the Officers' Association. The expenditure on relief this year exceeds by an average of over £100 per month the amount expended during the peak year 1933, and it is anticipated that the total expenditure from the General Fund alone will during 1935 reach £19,000. There has been an appreciable increase in the number of applications dealt with during the last six months.

Lord Hugh Cecil, one of the Fund Trustees, suggested the preservation of the name "The Anonymous Education Fund" as a sub-title to the "Lawrence of Arabia Educational Fund" in order to record the modesty as well as the generosity of the benefactor. This was approved.

The Chief of the Air Staff, Air Chief Marshal Sir Edward Ellington, will again lay the wreath on the R.A.F. War Memorial, and the ceremony is to take place at 11 a.m. on Sunday, November 10.

The Fund has recently been in correspondence with Mrs. Louis Bennett, who presented the Memorial Window in Westminster Abbey in memory of those members of the British Flying Services who fell in the Great War 1914-1918. In addition to the Memorial

Window, Mrs. Louis Bennett presented a bronze plaque in memory of No. 40 Squadron, in which her son was killed on August 24, 1918. This bronze plaque is now in the Station Church at the Central Flying School, Upavon. The present Commandant of the Central Flying School has arranged to visit Mrs. Louis Bennett in New York this autumn.

THE GRANTS COMMITTEE.

The usual meeting of the Grants Committee was held at Iddesleigh House on October 8. Air Comdre. B. C. H. Drew, C.M.G., C.B.E., was in the chair, and the other members of the Committee present were Mrs. L. M. K. Pratt Barlow, O.B.E., and Group Capt. C. H. K. Edmonds, D.S.O., O.B.E. The Committee made grants to the amount of £425 15s. The next meeting was fixed for October 22.

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

An Air Ministry Order introduces revised scales of pay, emoluments and conditions of service for members of the Princess Mary's Royal Air Force Nursing Service. The most important improvements are summarised briefly below.

The scale of pay on entry was previously £65, rising in seventeen years to £110; it is now £80, rising in nine years to £125. The scales for Senior Sisters and Matrons are also improved and now run up to £140 and £250 respectively. There will also be an increase in the number of substantive appointments in the grades of Matron and Senior Sister, which will allow a greater outlet from the grade of Sister, and will result in enhanced promotion prospects.

Rates of retired pay are also revised upwards, the maximum yearly rates being increased to £225 in the case of Matrons and £140 for both Senior Sisters and Sisters as compared with £170, £115 and £105 respectively at present. Rates of retiring gratuity to those permitted to retire voluntarily are increased from £250 after ten years' and £400 after fifteen years' service to £325 and £500 respectively.

Applications for appointment should be addressed to the Matron-in-Chief, Princess Mary's R.A.F. Nursing Service, Air Ministry, 5/6, Clements Inn, W.C.2.

FOREIGN OFFICER WITH THE R.A.F.

Capt. A. Gamboa, of the Peruvian Air Force, has been attached to the School of Photography, Farnborough, from October 7, 1935.

TRAINING OF CLERKS, ACCOUNTING

Direct entry clerks, accounting, need not receive instruction in typewriting, and the subjects of shorthand and typewriting are in future to be excluded from trade tests. Apprentice clerks under training as clerks, accounting, will continue to be instructed in typewriting, but will not be examined in shorthand and typewriting on passing-out.

AIR GUNNERS

It is notified in an amendment to King's Regulations and Air Council instructions that—

C.Os. must ensure that airmen employed as full-time air gunners have adequate opportunity to retain skill in their trades so that they may be competent to carry out their duties in those trades on reversion. The airmen will revert to their trades on promotion to the rank of sergeant or on appointment to the acting paid rank of sergeant. They will also revert to their trades in the rank of corporal—

(a) on posting overseas unless such posting is to a full-time air gunner's vacancy (subject, as regards the issue of duty pay, to para. 3455, clause 2);

(b) on being found medically unfit to fly; or

(c) if their C.O. considers them inefficient or otherwise not suited to carry out their duties as air gunners; but they will not be permitted to revert at their own request until they have completed two years' service as air gunners. On reversion under (a) or after two or more years' service as full-time air gunners, or by reason of promotion or appointment to the rank of sergeant, they will be remustered as part-time air gunners.

POLICE AND AIR RAIDS

It is understood that a Government training centre for instruction in fighting gas attacks and air raids is to be set up at Falfield, about 16 miles from Bristol, on the main Gloucester road. A resident staff will give gas defence instructions to police officers and members of fire brigades and first aid societies.

A suitable house has been acquired as the training centre.

ROYAL AIR FORCE GAZETTE

London Gazette, October 8, 1935

General Duties Branch

E. W. Martin is granted a short service commission as Pilot Officer on probation with effect from and seniority of September 21.

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of September 16:—J. Adam, K. L. Ashfold, R. S. Blake, H. Budden, E. P. Chapman, J. Culliford, A. C. Douglas, B. L. Evans, A. W. Fletcher, G. C. K. George, R. D. C. Gibson, H. S. Giddings, G. E. Hollings, C. B. Hull, D. H. C. Hull, L. L. Hunt, R. G. Hurst, D. A. V. John, C. E. Johnson, G. D. Jones, B. P. King, M. J. Loudon, D. J. McGlinn, M. H. T. Mellish, G. S. Milligan, W. H. R. N. Newton-Howes, R. H. Niven, A. E. Pringle, M. L. Robinson, K. M. Sclanders, H. W. A. Sheahan, W. J. L. Stevenson, P. E. A. Talbot, P. A. Tipping, R. R. S. Tuck, J. H. Van.

The following Pilot Officers on probation are confirmed in rank:—J. L. Barker (February 6); C. A. H. Evans, P. H. R. Saunders (March 16).

The following Flying Officers are promoted to the rank of Flight Lieutenant:—R. B. Wardman, W. J. Brighty (August 21); W. E. Rankin (August 28); D. M. T. Macdonald, L. H. Anderson, R. I. G. Macdougall (September 14).

The following Pilot Officers are promoted to the rank of Flying Officer:—C. M. B. Renshaw (July 13); H. M. T. Neugebauer, D. N. J. P. Leggett (September 3); J. S. Bartlett (September 24).

Sqn. Ldr. E. L. Ardley is placed on the retired list (October 3); F/O. C. D. P. Franklin is transferred to the Stores Branch on probation (September 19); the short service commission of Acting Pilot Officer on probation N. G. Kendrick is terminated on cessation of duty (September 19) (substituted for the notification in the Gazette of September 24).

Medical Branch

The following Flight Lieutenants are promoted to the rank of Squadron Leader:—F. B. C. L. B. Crawford, M.B., B.Ch. (August 25); N. I. Smith, M.D., Ch.B. (September 25).

The following Flying Officers are promoted to the rank of Flight Lieutenant:—(September 3) (seniority September 3, 1934).—H. F. Harvey, M.B., B.S.; J. C. Blain, M.B., Ch.B. (September 3) (seniority April 8).—A. W. Callaghan, M.B., B.Ch.

Flt. Lt. A. E. Vawser, L.M.S.S.A., takes rank and precedence as if his appointment as Flight Lieutenant bore date December 1,

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander.—H. P. Dale, D.S.O., D.F.C., to No. 11 Flying Training School, Wittering; to command, 1.10.35.

Squadron Leader.—A. S. Ellerton, O.B.E., to D.P.S., Dept. of A.M.P., Air Ministry, vice Group Capt. C. H. K. Edmonds, D.S.O., O.B.E., 1.10.35.

Squadron Leaders.—G. S. Hodson, A.F.C., to No. 11 Flying Training School, Wittering; for Chief Flying Instructor duties, 1.10.35. J. R. I. Scambler, A.F.C., to No. 11 Flying Training School, Wittering; for Administrative duties, 1.10.35. C. W. Attwood, to No. 102 (B) Squadron, Worthy Down; to command, 1.10.35. V. E. Groom, to No. 215 (B) Squadron, Worthy Down; to command, 7.10.35. D. F. Lucking, to No. 214 (B) Squadron, Boscombe Down; to command, 19.9.35. S. M. Park, to No. 38 (B) Squadron, Mildenhall; to command, 16.9.35. K. E. Ward, to No. 97 (B) Squadron, Boscombe Down; to command, 16.9.35.

Flight Lieutenants.—R. H. W. Empson, to R.A.F. Depot, Uxbridge, 30.9.35. T. P. P. F. Fagan, to Electrical and Wireless School, Cranwell, 30.9.35. R. G. Hart, M.C., to Headquarters, Fighting Area, Uxbridge, 30.9.35. T. W. Hodgson, to No. 1 Air Defence Group Headquarters, 27.9.35. A. B. Woodhall, to No. 41 (F) Squadron, Northolt, 22.9.35. S. L. Blunt, R. P. Cauthery, H. R. L. Hood, to No. 11 Flying Training School, Wittering, 1.10.35. P. J. Heber, to No. 1 Flying Training School, Leuchars, 30.9.35. D. J. Harrison, to No. 215 (B) Squadron, Worthy Down, 7.10.35.

Flying Officers.—C. J. P. Flood, to No. 210 (F.B.) Squadron, Pembroke Dock, 19.9.35. A. A. Adams, L. J. Neale, P. J. Polglase, H. V. Satterly, to No. 11 Flying Training School, Wittering, 1.10.35. P. C. Hilton, to No. 102 (B) Squadron, Worthy Down, 1.10.35. H. L. Fry, N. P. Samuels, to No. 215 (B) Squadron, Worthy Down, 7.10.35. A. P. Chamberlain, H. W. Dean, to No. 38 (B) Squadron, Mildenhall, 16.9.35. R. G. Coventry, to No. 214 (B) Squadron, Boscombe Down, 16.9.35. D. P. Hanafin, C. H. Mallinson, R. H. Page, to No. 97 (B) Squadron, Boscombe Down, 16.9.35.

Pilot Officers.—W. F. Beckwith, G. T. Gilbert, J. E. C. G. F. Gyll-Murray, A. B. Sowter, to No. 102 (B) Squadron, Worthy Down, 1.10.35. F. O. Dickson, P. Ruston, to No. 215 (B) Squadron, Worthy Down, 7.10.35. A. W. B. Barrett, J. J. McCarthy, to No. 214 (B)

AERODROME OBSTRUCTION—CRANWELL

Two areas approximately 50 yards by 60 yards immediately to the south of the tarmac on the southern aerodrome, Cranwell, are being returned. They are indicated by standard markings by day, but are not marked by night. The areas will be unserviceable for approximately two months and aircraft should exercise care when landing at this station.

1931, immediately following Flt. Lt. A. Sheehan, M.B., B.Ch., on the gradation list. Reduction takes effect from August 27.

Chaplains Branch

B. Hessian is granted a short service commission with the relative rank of Squadron Leader, with effect from and with seniority of September 6.

Commissioned Engineer Officers

The following Warrant Officers are granted permanent commissions as Flying Officers on probation with effect from and with seniority of September 19:—S. W. Birch, M. Downer, T. Griffiths, E. J. A. Knight, J. H. Tuckey.

F/O. on probation V. J. Casey is confirmed in rank (July 20).

Erratum

In the Gazette of October 1 for Flt. Lt. Graham Charles Bladon read Flt. Lt. Graham Clarke Bladon.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

F. H. Buggé is granted a commission as Flying Officer in Class A (September 18); G. R. Schooling is granted a commission as Flying Officer in Class C (September 25); F/O. H. J. Andrews is transferred from Class A to Class C (September 11) (substituted for the notification in the Gazette of September 17); F/O. A. C. Meredith is transferred from Class B to Class C (September 22); F/O. P. Drummond relinquishes his commission on completion of service (August 15).

The following relinquish their commissions on appointment to short service commissions in the Royal Air Force (September 16):—F/O. P. E. A. Talbot; Pilot Officer on probation K. L. Ashfold.

F/O. J. A. Mertens relinquishes his commission on appointment to a commission in the Special Reserve (September 9).

SPECIAL RESERVE

General Duties Branch

J. A. F. Mertens is granted a commission as Pilot Officer on probation (September 9); P/O. E. W. Martin relinquishes his commission on appointment to a short service commission in the Royal Air Force (September 21).

Squadron, Boscombe Down, 16.9.35. R. G. R. Buckley, R. A. Charles-Auckland, T. R. Manson, to No. 97 (B) Squadron, Boscombe Down, 16.9.35. A. J. Guthrie, J. H. Lowe, to No. 38 (B) Squadron, Mildenhall, 16.9.35.

Acting Pilot Officers.—R. H. Paterson, to R.A.F. Balloon Centre, Rolleston Camp, 27.9.35. E. G. Campbell-Voullaire, to No. 97 (B) Squadron, Boscombe Down, 16.9.35. A. S. Ainslie, C. D. Beaumont, J. R. I. Bell, B. G. L. Betheder, R. Cluer, W. A. L. Davis, J. N. W. Farmer, G. E. Ford, J. H. Greswell, P. J. Halford, J. D. Harris, R. G. Ker-Ramsay, R. N. Lambert, A. W. Lee, G. Lowe, V. E. Marshall, G. F. W. Morrison, W. G. Moseby, M. G. F. Pedley, R. A. G. Petrie, K. Slater, D. C. Smyth, F. G. R. Thomas, G. Thomas, J. G. Towle, J. W. B. Vernon, E. N. Wakelin, and G. M. Wyatt, all to R.A.F. Depot, Uxbridge, on appointment to short service commissions as Acting Pilot Officers on probation with effect from 30.9.35.

Stores Branch

Flying Officer.—C. D. P. Franklin, to School of Store Accounting and Storekeeping, Cranwell, 19.9.35.

Accountant Branch

Group Captain.—C. G. Murray, O.B.E., to Headquarters, Coastal Area, Lee-on-the-Solent; for duty as Command Accountant, vice Wing. Comdr. H. F. Fuller, 27.9.35.

Flight Lieutenant.—R. Trippett, to No. 11 Flying Training School, Wittering, 1.10.35.

Medical Branch

Wing Commander.—P. H. Young, to No. 11 Flying Training School, Wittering; for duty as Senior Medical Officer, 1.10.35.

Squadron Leader.—C. J. S. O'Malley, to Princess Mary's R.A.F. Hospital, Halton; for duty as Medical Officer, 1.10.35.

Flight Lieutenant.—G. S. Strachan, to Central Medical Establishment, London, 1.10.35.

Chaplains Branch

Rev. B. Hessian, M.A., to Headquarters, R.A.F. Halton; for duty as Chaplain (C. of E.), on appointment to a short service commission, 6.9.35.

CORRESPONDENCE

The Editor does not hold himself responsible for the opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

THE AERO DIESEL ENGINE.

[3073] In your issue of October 3 this question is revived and dealt with by Mr. Ricardo in his characteristically able manner.

There are two dominant questions to be considered: What was it that brought about the very sudden waning of official enthusiasm for the Diesel? And what is the factor that has retarded its development to such an extent that such experienced investigators as Mr. Fedden can see little promise of its ultimate success?

The answer is "fuel injection" in both cases, for there is no doubt that it is the failure of fuel injection to comply with the requirements of the aero engine that has caused its abandonment by nearly everyone concerned.

With the commercial vehicle engine there were at first the same disabilities, low b.m.e.p., smoke, detonation, sludge formation, and many other faults, but it is Mr. Ricardo we have to thank to a very considerable extent for the progress that has been made.

It will be agreed that the fuel injection equipment now available records an exceptional measure of progress, but this progress has been made by the addition of a series of rectifiers of which the differential injector is the dominating item. To these rectifiers Mr. Ricardo added others in the form of turbulence chambers, with the result that a commercial vehicle powered with a Diesel engine is a more efficient and satisfactory implement than its parallel petrol example.

This may apply to the vehicle but it does not do so to the aero engine, for the main reason that the power output, b.m.e.p. and revolutions fall far short of present petrol performance.

With correct injection increased output can be obtained with-

out increasing the present maximum pressures (of the Diesel engine) and the b.m.e.p. can be sustained at the higher revolutions in step with the volumetric efficiency of the engine. Again, the Diesel engine lends itself to supercharge in a manner that cannot be approached by the petrol engine.

Designers, makers and authorities are not entirely free from blame, as there has been too great a tendency to follow petrol practice both in principle and detail, and by so doing many possible improvements have been prevented.

What is required is the relegation to the scrap heap of everything that savours of adaptation and palliation coupled with the insistence upon an injection system that is *fundamentally* correct. With these conditions the aero Diesel will become as advantageous to the aeroplane as it is to the lorry.

There is no doubt in the minds of those who are studying this question that an aero Diesel engine can be constructed with a power-weight ratio for sustained horse-power comparable with that of the petrol engine.

A. F. E.

London, W.C.2.

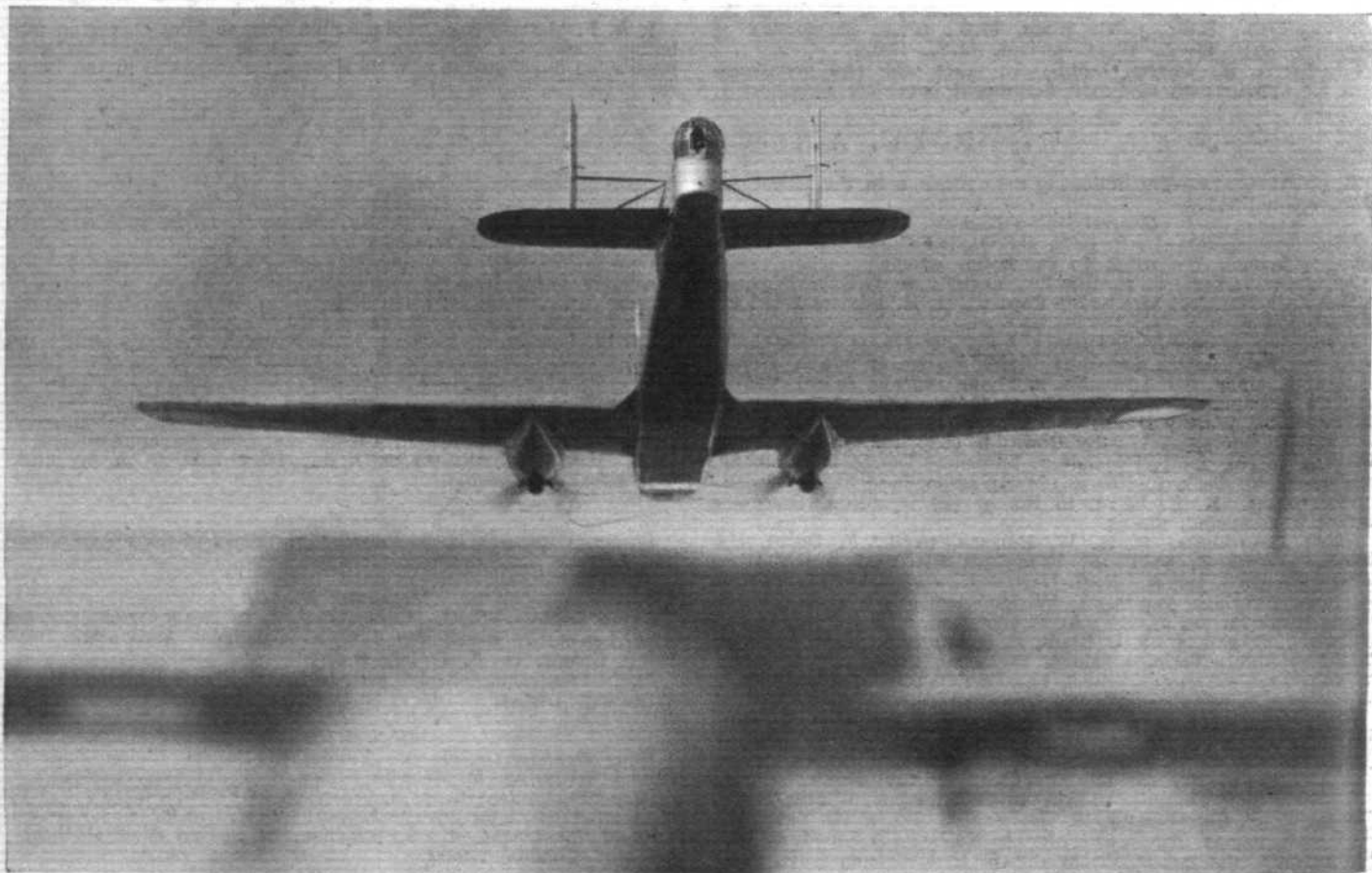
MEGALITHIC REMAINS.

[3074] In *Flight* of September 19 there appeared a paragraph on the subject of the discovery of megalithic remains. Actually, the discovery of the remains in question was not made from the air, but during the ground survey made by me of certain parts of Malta during the last few years. Although demobilised in 1919 as flight lieutenant, my occupation in Malta was on the civil side of the Air Ministry, and entirely confined to the ground.

R. FORBES-BENTLEY.

Holyhead.

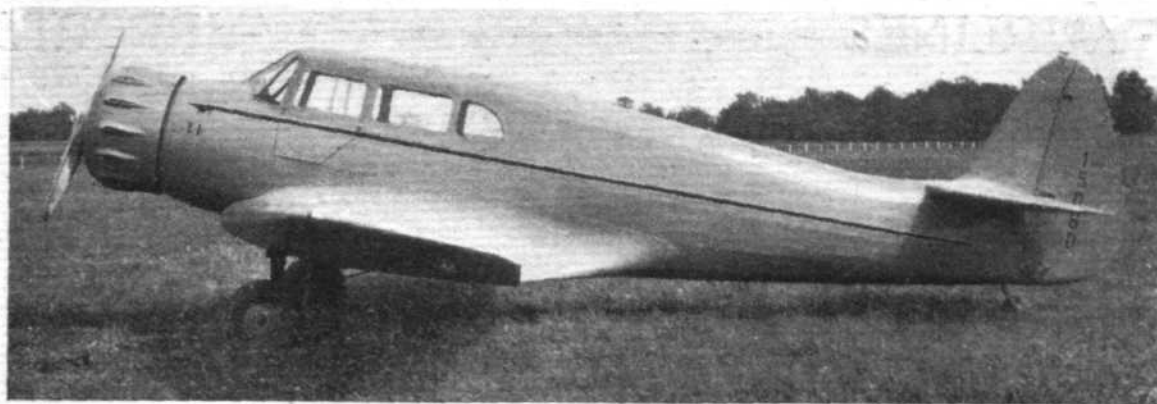
AN ARMED TRANSPORT



In the nose and tail of the A.W. XXIII there is an Armstrong-Whitworth revolving gun turret. The position from which this photograph was taken—the gunner's cockpit in a following machine—would be by no means an enviable one in time of war. Other pictures will be found on pages 398, 410b and 410c. (*Flight* photograph)

TOURER and TAXI

The Fairchild "45" : A Five-seater Combining Comfort With Performance



SOME of the more opulent private owners and certain "charter" operators have shown increasing interest, lately, in 4-5-seater cabin machines. The latest American example in this category is the Fairchild "45" with 225 h.p. Jacobs radial.

Chrome molybdenum steel tubing is the basic material for the fuselage structure: the tubes, apparently, are of square section. The fuselage is faired to give a pleasing appearance and good aerodynamic shape, and is covered with fabric.

Of N.A.C.A. 2218 section at the root and N.A.C.A. 2209 section at the tips, the low cantilever wing has an angle of incidence of 2 deg., 6 deg. of dihedral and a sweep back of 15 deg. It is tapered both in plan form and thickness. The outer panels are constructed of spruce box spars and spruce ribs, the drag trusses consisting of aluminium alloy built-up "I" sections, double-wire-braced, with steel tie rods. Plywood covers the leading edge, the remainder being fabric covered. Aluminium alloy is used for the centre section panel, extruded shapes with built-up sections being used for the spar flanges.

The centre section is covered with corrugated aluminium alloy sheet, with smooth sheet on top to provide stiffness for the "walkways." Both the leading edge and the under side are similarly covered with smooth aluminium alloy sheet. The centre section houses the retractable undercarriage, baggage compartment and two sixty-gallon fuel tanks, which may be removed by detaching a cover on the under surface.

Three-position Flaps

Split balanced-type flaps extend from aileron to aileron in three sections, one on each wing panel, and one on the centre section. They are of special N.A.C.A. section with a chord of 15 in., which is 19.1 per cent. of the mean aerodynamic chord. It is possible to lock them in three positions—closed, deflected 30 deg. and deflected 60 deg. They are hinged aft of the leading edge, so that, on deflection, this edge swings upward and backward to fit snugly against the under side of the wing, thereby, it is claimed, increasing the efficiency. Operation is by push and pull rods, all hinges being mounted on ball bearings, and the structure is of aluminium alloy tubing with metal ribs, the leading edge being covered with aluminium sheet and the remainder covered with fabric. The ailerons are of the slotted balanced type of alloy with fabric covering.

Of full cantilever design, the tail surfaces are made of aluminium alloy and steel, for the greater part with fabric covering. Fin and tail plane embody two spars diagonally braced for torsional rigidity. Back to the front spar the leading edges are covered with aluminium alloy sheet. The elevator and rudder are of the Handley Page balanced type with aluminium alloy ribs mounted on steel torque tubes. Adjustable trimming tabs are fitted, being operated by a fine thread screw at the tab to eliminate play. The screw is operated by a short chain over a sprocket attached to a cable extending to the cabin.

Each wheel of the undercarriage is mounted on a single oleo-spring shock-absorber leg with a 7-in. stroke, each leg being braced by a folding tripod operated by a long screw attached to the rear centre section spar and actuated by a crank in the cabin, with a chain connection. The entire undercarriage structure is of chrome molybdenum steel. When retracted the wheels extend 11 in. below the wing, in case of forced landings. In drop tests 4.85 G was the highest acceleration

attained, compared with the 6.02 G allowed by the Department of Commerce. The shock-absorber struts are heat-treated to 180,000 lb./sq. in. Medium-pressure air wheels with hydraulic brakes are used, and the tail wheel is of the full swivelling type, incorporating an oleo strut.

A Jacobs radial engine giving 225 h.p. at 2,000 r.p.m. is mounted in rubber to absorb vibration, and is enclosed in an N.A.C.A. cowl. At the sides the cowl is hinged about the top for inspection and maintenance purposes, and sections of the inner cowl are removable for engine adjustments. The oil tank is located on the fireproof bulkhead.

There is a roomy cabin, the rear seat of which is 51 in. wide and 18 in. deep, the front seat being 47 in. wide and 16½ in. deep. To facilitate movement between the front and rear sections of the cabin, a portion of the front seat is arranged to fold. Behind the rear seat is a shelf a foot wide for small baggage and miscellaneous articles. On the starboard side a door opens directly into the rear section, and a second door is located on the port side by the pilot's seat.

Hot or cold air may be admitted to the cabin from a duct on the side of the fuselage, the amount of cold air or heat being regulated by shutters from front or rear seats. Ventilation is controlled by sliding windows in the front section of the cabin and a small vent in the roof.

The control column is of the wheel "throw-over" type. The two sets of rudder pedals are adjustable in flight by a small lever on the side of the pedal, which can be operated by the foot. On the port side of the front section are the brake pedals, the parking brake being placed at the pilot's left hand. The flap lever is in the centre, and the undercarriage hand crank on the left of the pilot. It is possible to reach the trimming tab control from either front seat.

Instruments are grouped in front of the left-hand front seat, the throttle and mixture controls being to the right of the instruments so that they can be reached from either side. To the right of the instrument panel is a compartment for the storage of maps and small articles.

A Klaxon horn and red lights, associated with the throttle when the engine is shut down, warn the pilot that the wheels are retracted when a landing is about to be made. A green light shows that they are extended. There is, in addition, an indicator on the instrument panel which shows the position of each wheel at all times.

FAIRCHILD "45"

FIVE-SEATER CABIN MONOPLANE, JACOBS ENGINE
225 H.P. at 2,000 R.P.M.

Dimensions and Weights

SPAN...	39ft. 6in.
WING AREA...	248 sq. ft.
WEIGHT EMPTY...	2,277 lb.
GROSS WEIGHT...	3,600 lb.
WING LOADING...	14.5 lb./sq. ft.
POWER LOADING...	16 lb./h.p.

Performance.

MAXIMUM SPEED...	160 m.p.h.
CRUISING SPEED...	147 m.p.h.
LANDING SPEED (WITH FLAPS)...	48 m.p.h.
LANDING SPEED (WITHOUT FLAPS)...	60 m.p.h.
INITIAL RATE OF CLIMB...	640ft./min.
RANGE...	600 miles

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



TOWARDS HONG KONG: The Imperial Airways D.H.86 *Dorado* at Penang. On the left can be seen the four members of the crew, including Capt. W. Armstrong. Third from the right is Major R. L. Nunn, the D.C.A. for Malaya.

THE WEEK AT CROYDON

Retracted : Protecting Local Property : Prodigious : Passport Pleasures

A CURIOUS and unusual incident at Croydon early last week was the landing of an Avro 652 with the undercarriage retracted. The machine was in course of being handed over to Imperial Airways, but was still being flown, it is understood, by an Avro pilot. Exactly why it happened I do not know, nor does it matter, for the wheels of the 652 protrude sufficiently to prevent damage on a moderately smooth surface. Absolutely no damage was done to the machine save for bent propellers, which, being metal, can doubtless be straightened.

Air Commodore Sir Charles Kingsford Smith, usually known as "Smithy," is impatient to leave us and fly home in his Lockheed Altair, now at Croydon in charge of Rollason Aircraft Services. It is rumoured, however, that the authorities would not allow him to leave Croydon with the fuel he needs, amounting to some 400-odd gallons—equal to the full fuel load of a *Heracles*. Much as I admire "Smithy" I am inclined to agree with the authorities. The responsibility of the Air Ministry (as we are frequently informed in cases of alleged and usually innocuous low flying) extends to residents and property in the vicinity of Croydon, which, incidentally, is a purely commercial airport after all.

One of the week's best stories concerns a private owner with wireless who continued to call Croydon on the wrong wavelength. Heston chipped in with "You're on the wrong wave for Croydon," but was ignored for some time. At length with the tone of one tolerant of an importunate interrupter, the pilot remarked "Thanks, Heston, understand I am a long way from Croydon."

The annual scare about the vast flocks of birds infesting the airport is with us again. It happens at migration time, and, though dangerous, it cannot be helped. Some indignant birds have been seen flying backwards in the slipstream of machines and performing aerobatics their mothers never taught them.

Recent passenger lists have shown a number of interesting names. Master Trenchard John Fowle, who left Croydon by "Imperials" for Africa last Saturday, is, however, one of the most hardened air travellers we see. Aged eight years, he has made seven journeys to or from Koweit, where his father is political agent. He eyes photographers severely,

and in a bored voice explains to reporters who have never flown that there is nothing in it and that he takes a jig-saw puzzle along because of the tedium. There are no flies on Master Trenchard John. "Don't go and loose my suitcase, now," says he to a porter, or, "Where's my overcoat? I don't want it sent to Paris by the next plane you know. Just put it on my seat, will you?" I believe it was Trenchard J. who sent a steward scurrying back to *Heracles* for a piece of half-consumed cake.

An interesting case of the alleged illegal importation of a dog is pending, I am told. Actually nobody saw the dog until it was on terra firma. If you can keep a dog on the machine and not let it touch the ground you may re-export it without having committed any offence.

Unusual Visibility

Mr. Sidney St. Barbe, one of the Croydon primitives who was with us in the early gum-boot and duck-board age, was seen again at the airport last Saturday. It was a marvellous day for his purpose, which was to inscribe the name of a well-known saponaceous substance across the face of the skies. He told me that so good was the visibility that he could see the mouth of the Somme when he was above the English coast.

Somebody has written to that newspaper famous as a receptacle for queer grouses to say that Channel-crossing is so uncomfortable. "Passengers," he says, "obviously feeling unwell after a bad crossing were made to line up and stand in pouring rain to have their passports examined. In addition we were from time to time subjected to a shower bath of spray from seas breaking over the harbour wall." At Croydon, passports are, of course, examined under cover and, in the rare event of airsickness, chairs are provided and stewardesses look after the sufferers. So far from subjecting air passengers to cloudbursts and giant breakers is our idea of decorum that one company has just provided large tarpaulins so that even the passengers' luggage shall not get wet in transit. Moreover, there is no lining up, and everything is done as pleasantly, swiftly and informally as possible without loss of efficiency.

A VIATOR.

CIVIL FLYING IN INDIA

A Resume of the Recently Published Report : Interesting Developments

INDIA was for long the great gulf fixed between the air systems of Britain on the one side and of Australia on the other. That gulf has now been bridged, and the *Report on the Progress of Civil Aviation, India, 1934-35*, is an extremely interesting publication. The map which accompanies it is most fascinating. Coloured lines show how the service worked conjointly by Imperial Airways and Indian Trans-Continental Airways leaves Karachi together with the services of K.L.M. and Air France, but leaves them at Jodhpur to go north to Delhi, while the Dutch and French services make straight for Jhansi. All three join again at Allahabad, and continue in company through Calcutta and Rangoon as far as Bangkok, where Air France strikes east for Saigon, and the other two turn south for Singapore.

Not less impressive is the long line which traces the course of the Tata air line from Karachi to Bombay, Hyderabad (Deccan), and Madras, with a dotted line to show the proposed extension via Trichinopoly to Ceylon. Before long we hope to see a straight line of a daily air service between Bombay and Calcutta, but that has not yet come into being. Indian National Airways have several shorter, but very interesting, lines, notably that from Karachi through Multan to Lahore. The Irrawaddy Flotilla Company has started a service with a seaplane Fox Moth between Rangoon and Moulmein. The map evidently went to press before the most intriguing of all the services was started, namely, that by

Himalaya Air Transport and Survey, Ltd., between Hardwar in the United Provinces and Gauchar, which was opened on April 19 last. Gauchar aerodrome is at a height of 3,000 feet in the valley of the Ganges, where it winds through the Himalayas. One of the regular pilgrimages by Hindus is from Hardwar to the sacred mountain of Badrinath. Gauchar is seventy miles from Hardwar on the way to Badrinath, and on foot it took the pilgrims ten days to get so far. Now, by flying, they can get to Gauchar in one hour. Few air services anywhere can show a greater saving of time and of energy. The company hope ultimately to make an aerodrome at Badrinath itself, near the temple, which stands at 10,000 feet.

The report comments on the good results which have already resulted from the introduction of a flat rate for letters from Britain. Up to November 16 last a half-ounce letter to Karachi cost 6d., and for air transport to any place inside India an additional 2d. was charged. It seems that British letter writers (and not only Scotsmen) would pay the 6d. but struck at the extra 2d., and the internal air services in India suffered accordingly. Now the original 6d. covers transport along any of the internal air lines in India. The weight of mails carried by those services showed an immediate jump, though part of this happy result is attributed to the duplication of the weekly flights from England which began last January. With the expected introduction of an Empire flat rate of 1½d. per half-ounce in 1937, a regular boom may be expected.

Making Up Time

WHEN the *Hanno* was damaged in landing at Entebbe at the beginning of last week an Armstrong-Whitworth Atalanta was rushed from Kisumu, near Kenya, to pick up the stranded passengers and mail. It had flown more than 1,000 miles the previous day.

Piloted by Capt. J. S. Sheppard, the machine left Kisumu at 3 on Tuesday morning, and arrived at Germiston aerodrome the same night at 10.20, having covered 1,777 miles from its early morning start, a record day's flight for the service.

Traffic at Heston

DURING the month of September 3,393 aircraft movements were recorded at Heston—an 8 per cent. increase on those of September last year. Jersey Airways carried 1,285 passengers on the Heston route—22 per cent. more.

It is interesting to compare the average loads of passengers carried per aircraft by Jersey Airways in the Septembers of 1934 and 1935. It is not possible to obtain a really true comparison because Dragons were used last year and two

D.H.86s, and, usually, one D.H.89 were operating on this route in 1935. Bearing this in mind, the average of 7.7 passengers per machine in September, 1935, compared with the average of 4.1 passengers in September, 1934, is interesting, if not very illuminating statistically.

A comparison of inward and outward traffic on this line shows that at the present time of year incoming loads invariably exceed the outgoing ones. People are still returning from their holidays, and it will probably be a few weeks before this air line settles down into its winter routine, carrying, for the most part, business men who find that Jersey Airways enables them to work in London and yet spend their week-ends at home in the Channel Islands.

Apart from work connected with the regrettable Abyssinian affair, air taxi business has been quiet. A Western Airways' Dragon arrived last week, occupied solely by a lady and two greyhounds which she was selling in London. The value of the dogs can be conjectured from the luxury of the transport.

British-American Air Services carried full loads on three days out of the four on which they ran their special daily service to Newmarket. This service has been, and is being, repeated this week on Tuesday, Wednesday, Thursday and Friday, for the Cesarewitch.

The Lille Service

ON Saturday, and with due ceremony, British Continental Airways' service to Lille was inaugurated with a Dragon. In the accompanying photograph can be seen from left to right, Mr. J. R. Bryans, Mr. F. W. Jones (Managing Director), Sir Percy Mackinnon (Chairman), Mr. Graham Mackinnon, Mr. V. J. W. Bredenkamp (pilot), and Mr. M. H. Duke (wireless operator). The actual service was opened on Tuesday, while that to Brussels was opened on Monday with a Rapide. The Antwerp and Amsterdam service will be started before the end of the month.

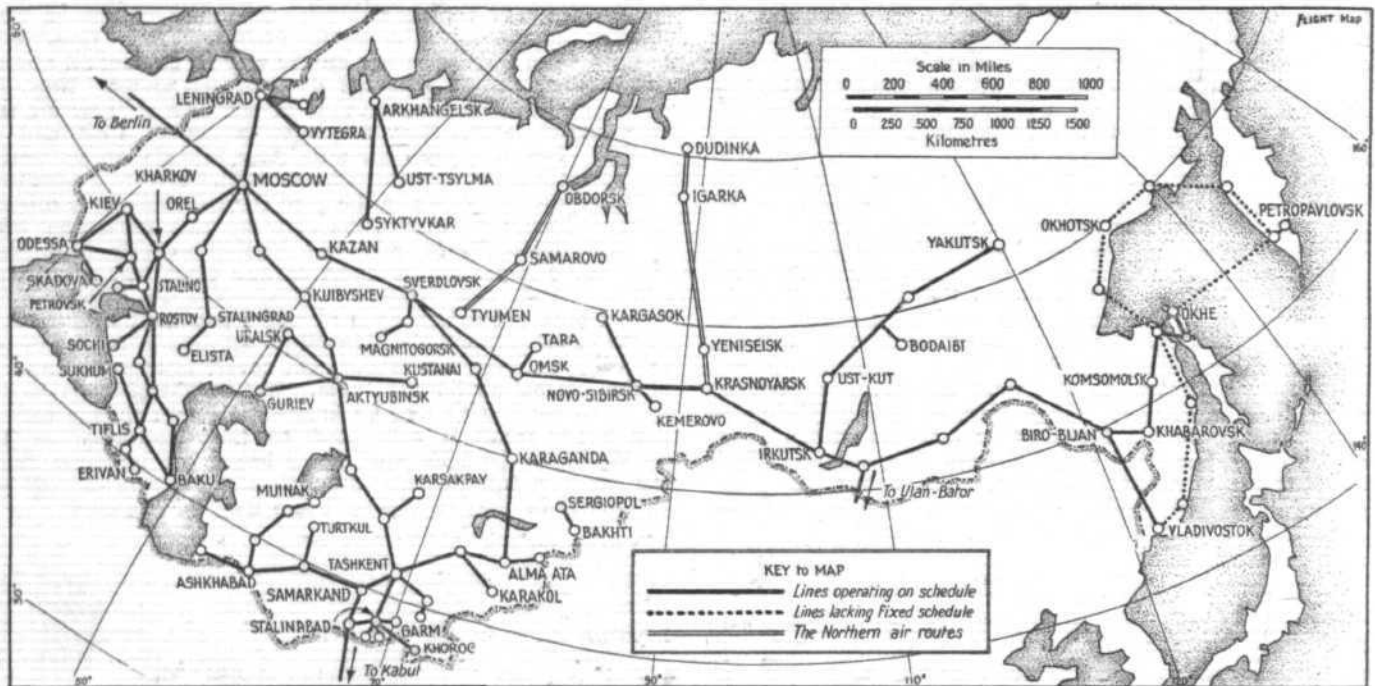
During last week the company made two interesting charter trips, one of which was to Avignon to pick up Mr. Griffith, who was, unfortunately, injured in a crash on his way to Abyssinia with one of Mr. Brian Allen's specially tanked Gulls.



INAUGURATION: The management and crew before the inaugural flight to Lille. (Flight photograph.)

Commercial Aviation**PROGRESS in the U.S.S.R.**

*Russia's Network of Commercial Air Routes : 1934 Statistics Record
65,000 Passengers and 4,200 Tons of Goods*



Soviet Russia's air routes as they appear to-day. The longest trunk route is that from Moscow to Vladivostok.

THOUGH most people are aware that commercial aviation in Soviet Russia has progressed rapidly during recent years, very few have any real knowledge of conditions as they are to-day. It is hoped, therefore, that these notes may be of interest.

Civil aviation throughout the Union is concentrated under the administration of the Central Management of the Civil Airfleet (Aeroflot), which is under the immediate supervision of the Council of Peoples' Commissars of the U.S.S.R.

There are in this administrative structure thirteen territorial departments, each of which controls the air service operating within its territory. All branch lines and through lines passing the territory of the local administration are directly responsible to and controlled by the territorial department.

The commercial services comprise a number of huge trunk lines, covering an enormous distance, which link up Moscow with the outlying parts of the country, as well as those air routes of the Federated Republics which are of importance to the whole Soviet Union.

Main Trunk Routes

Of the three trunk lines which connect the capital with the Far East, the Transcaucasian Federation of Soviet Republics and the Middle Asiatic Republics, the longest is the Eastern Route; it extends from Moscow to Vladivostok, a distance of nearly 6,214 miles. It passes over the Moscow Province, crossing the Volga, that greatest of Russian rivers, at Kazan, the capital of the Tartar Republic; then it passes over the Ural chain to Sverdlovsk, the centre of the mining industry of the Urals, famous for its precious stones. From the fertile plains of Western Siberia, the line passes Omsk, Novo-Sibirsk, the centre of Western Siberia and Irkutsk, the centre of Eastern Siberia. Leaving behind the ancient granite tableland, in the midst of which Lake Baikal lies in a hollow valley, the line climbs over the spurs of the Yablonov chain, proceeding thence to China and descending in the Amur Basin at Khabarovsk, the centre of the Far Eastern region, and ending at Vladivostok, the gate of the Pacific.

Joining at Moscow the Soviet-German Deruluft line, which runs from Berlin through Koenigsberg to the Soviet capital,

this route permits passenger flights from the shores of the Atlantic to the Pacific Ocean.

The southern trunk line connects the centre of the Soviet Union with the Ukraine, the North Caucasus and Transcaucasia. It runs from Moscow to Kharkov, the largest industrial city of the Ukraine. Branching off from Kharkov, there is a spur line to Kiev, one of the oldest Russian cities, now the capital of the Ukrainian Republic, which stands on the banks of the Dneiper. From Kharkov the trunk line continues in a south-easterly direction to Rostov-on-Don, the centre of the Azovo-Black Sea region, passing over the rich fields of the Cuban and Cherkess collective farms, and at the foothills of the Caucasus meets a railway station, the name of which can be translated as Mineral Waters; near here are situated the world-famous medicinal springs of Kislovodsk and Zheleznovodsk. At Mineral Waters the line branches off in two directions. One spur leads to the east, along the shores of the Caspian Sea, through Daghestan to Baku, the great oil-bearing region of the Soviet Union, then, turning to the north-west, over the Kura Basin, ending at Tiflis, the centre of the Transcaucasian Federation of Soviet Republics and of the Georgian Republic. The other branch line connects Mineral Waters directly with Tiflis, crossing the Caucasian mountains at a point where the peaks reach an elevation of 16,404 feet.

The third trunk line links Moscow with Tashkent, the capital of the Uzbek Socialist Soviet Republic, which has the most fertile cotton districts of the Soviet Union. The line passes through Samara and Aktyubinsk.

These three trunk lines are the chief arteries of the unified air services which link Moscow with the most important of the outlying districts—important, that is to say, in regard to the national economy. These are joined at various points by the air lines of the different republics, which, as a general rule, radiate from the capitals of those republics. In the Ukraine, the junction is Kharkov, from which air lines lead to Kiev, to Dnepropetrovsk and to Odessa, port on the Black Sea, to Mariupol, Berdyansk and the Sea of Azov.

From Tiflis, the capital of the Transcaucasian Republics, one line branches off to Erivan, the capital of Soviet Armenia, and another in a westerly direction, over the Rion Basin, the legendary Colchide of the past, where vast plantations of citrus trees are now being laid out. This line passes over the Soviet sub-tropical regions, where lemons, tea and tobacco are grown. It ends on the shores of the Black Sea at Sukhum, the centre of the Abkhasian Republic.

Commercial Aviation

The new industrial centres of the Urals and Siberia are linked to the Great Eastern trunk line by an air route which runs from Sverdlovsk through Tcheliabinsk to Magnitogorsk and the Novo-Sibirsk-Kemerovo line. The latter route has great significance for developing the sparsely populated Narym region.

In Irkutsk there branches off a line which extends far to the north, to Yakutsk, the centre of the Yakutian Republic. From it in turn branches off the Vitim-Bodaibio line. These two routes are of extreme importance for Yakoutia, serving as they do a vast expanse of territory distant by thousands of kilometres from the railroad and which have scarcely any mechanised transport. The Vitim-Bodaibio line passes over a district rich in gold, the centre of the Soviet gold industry.

The Ulan-Uda-Ulan Bator links up the U.S.S.R. with the Mongolian Peoples' Republic.

From Khabarovsk in the Far East stretch lines to Kamchatka and Sakhalin, serving the fisheries and oil fields of these districts. In summer, communications are maintained between Marinsk and Vladivostok by means of seaplanes, which make stops at a number of points on the shores of the Sea of Okhotsk.

Aerial transport has become an indispensable means of communication for the national republics of Central Asia and Kazakhstan. In these one-time backward regions, where there are few good roads, air communications play a tremendous rôle in developing the national economy. The centre of these air routes is Tashkent, the capital of the Uzbek Republic, whence one line leads to Termiz-Kalub (Afghanistan), and another, stretching from Stalinabad (the capital of the Tajik Republic) over the foothills of the Pamir—"the roof of the world"—extends to Horog, a border city and the centre of the Mountain-Badakhshan Province, where mountain passes are practically the sole means of communication. It was only in 1934 that an automobile road, 450 miles in length, was built from Horog to the station Osh. The road crosses mountain passes at a height of 16,400 feet above sea level. Ashkhabad, the capital of the Turkmenian Republic, is connected by air with a sulphur plant situated among the dead sands of the Kara-Kum desert.

The Tashkent-Alma-Ata line links up Central Asia with Southern Kazakhstan, a continuation of this line extending from Alma-Ata through Akmolinsk to Petropavlovsk, thus connecting Kazakhstan with the Siberian railroad trunk line.

Among the air lines in the north of the Soviet Union is one from Archangel to Syktyvkar, which connects the port of Archangel on the White Sea with the Komi Autonomous Province, situated far from any railroads. The northern air services also include lines from Tyumen to Obdorsk (at the mouth of River Ob) and from Krasnoyarsk to Dubinskoye (at the mouth of River Enisei).

Obdorsk and Dubinskoye, as bases for aerial communication with the Arctic, are under the administration of the Central Administration of the Northern Sea Route. These lines connect the northern seaboard of the U.S.S.R. with the Siberian railroad trunk line.

Future Extensions

This vast network of airlines, extending from the Baltic to the Pacific, from the Pamir to the Kara Sea, vanquishing as they do the resistance of mountain, bog and flood, cannot be said, however, to satisfy all the requirements of the national economy. For this reason the Soviet Government has resolved to extend this length to 52,800 miles by the end of the Second Five Year Plan, that is to say, by 1937.

In addition to the air routes, which possess significance to the whole of the Soviet Union, there is a network of local lines and circular mail routes in various districts. Their total length runs into some 12,400 miles. By 1937 the total length of these lines should reach 21,750 miles.

The varied forms of air transport, involving all branches of the national economy, gave the following figures for 1934: a total of twelve million miles covered; 65,000 passengers and 4,200 tons of cargo carried. Almost all the machines employed are of Soviet make.

Apart from transport a number of commercial machines are engaged on such varied work as crop spraying, forest patrols, ice patrols, and aerial photography. Experiments have even been made with sowing of crops from aircraft; this method has proved particularly successful with rice. S. Z.

Farther Across

LAST Sunday the Pan American Airways' special Sikorsky LS-42 reached Guam Island in another test flight across the Pacific carrying four passengers. Guam is the last of the island bases before the Philippines.

R.A.S. Traffic

RAILWAY AIR SERVICES' machines have flown some 500,000 miles during their regular summer service, and the number of passengers carried was 300 per cent. up as compared with last year's number. More freight is also being carried.

The Martin Clipper Out

LAST week the first of the big Martin "Clipper" boats was formally handed over to Pan American Airways, and was flown with a crew of five and with thirty-eight passengers from Baltimore to Washington and back. A second boat is now completed, and a third is nearly ready.

Another Pacific Service

ALTHOUGH, as reported in *Flight* of October 3, there has been a temporary hitch in the discussions between Pan American Airways and the New Zealand Government, the scheme is more or less complete. The stopping places will be Honolulu, Kingman Reef (Fanning Island), and Pago Pago (Samoa) on the way to Auckland. Before next July, when the service may be started, the Northern Pacific service should be in full operation.

In Czechoslovakia

DURING 1935 the Ceskoslovenske Statorni Aerolinie ran six services—between Prague and Bucharest, Susak, Uzhorod, Carlsbad and Opava and between Piastany, Bratislava and Vienna. Next year two more services will be operated—from Susak to Dubrovnik or Ragusa and between Prague and Moscow (via Kiev).

C.S.A. was founded in 1923, and now has sixteen machines, including two Airspeed Envoys and a Saro Cloud. At the end of August this year the company had carried 73,746 passengers.

Croydon on the Air

TO-MORROW, from 3 to 3.30 p.m., the B.B.C. National programme will include something extremely interesting. Croydon will be "on the air" from the control point of view. The broadcast has been organised by Mr. Norman Shelley, and both Mr. "Jimmy" Jeffs and Capt. O. P. Jones will assist in the good work.

Channel Island Aerodromes

THE provisional licence granted to the Guernsey Aero Club for joy flights from their private aerodrome at L'Erée has been renewed by the island authorities for another year. It was stated that the club intended to use Mongoose-Avros, and considerable extensions will be made to the site in order to accommodate air services.

The Royal Court of Guernsey, which exercises jurisdiction over all the other Channel Islands except Jersey, has granted a commercial licence for the use of the aerodrome on Alderney privately owned and laid out by Channel Islands Airways, Ltd.

A Week-end Inner Circle

LAST week Air Dispatch received an emergency call from Miss Sonja Henje, the ice-skater. Owing to unusually heavy passenger lists none of the ordinary services to Paris were able to carry her many trunks, and it was imperative that these should arrive in Paris the same evening. The Paris Dawn Express was the one remaining hope, but unfortunately it was carrying a full load. Mr. Eric Noddings, however, the A.D. chief pilot, was standing by and at 8.45 p.m. he started off with the Dragon C.C.R. and arrived in Paris, after an extremely fast trip, at 10.30 p.m. At 1.15 a.m. Mr. Noddings was back at Croydon, in plenty of time for the machine to be loaded up with the early morning newspapers and then set off on a second trip to Paris.

Repeated requests for the Inner Circle service, which had been suspended for the winter, decided Commercial Air Hire to run a week-end service twice daily. Machines leave Croydon at 11 a.m. and 2.30 p.m., and leave Heston at 12 p.m. and 3.15 p.m.



A MULTUM-in-PARVO SAILPLANE

The Construction of the Penrose Pegasus, a Small Machine Which Aroused Great Interest at Sutton Bank, Described by its Designer

ALTHOUGH the Pegasus was finished only early this year, the original design and stress-work was commenced in September, 1932, and construction a few months afterwards. Originally it was optimistically expected to finish the machine in six months, but there were many unavoidable delays, apart from the fact that everything took much longer than was anticipated and despite the considerable help which the designer received from his wife and many members of Westland Aircraft, Ltd.

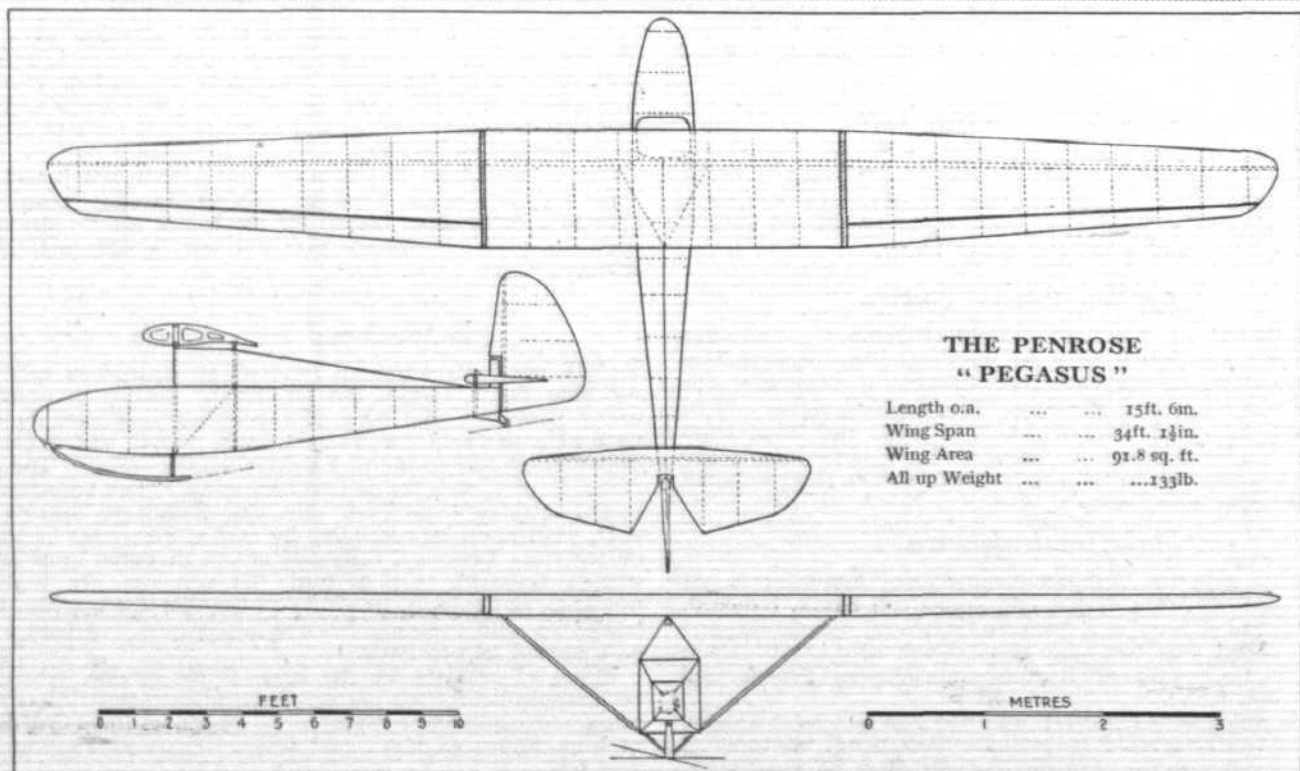
In the dark ages of 1931-32 it had been forcibly brought home to the designer that there was much too much heaving and pulling and all too little gliding, and this was attributable in part to the great weight and size of the conventional sailplane. An investigation of different types showed that it should be quite possible to realise a very satisfactory performance from a machine having a good value of span^2 :area and a considerably greater loading than those then current. Other requirements were then taken into consideration, such as portability, controllability, small size for transport, etc., and ideas gradually clarified into the Pegasus. Happily, its pilot was not of great size, and weighed 10 stone, and this, of course, facilitated the design.

In view of the fact that the machine was to be home-made, both from the point of view of interest and of cost, it was found vital to make each structural unit of very short length, as, in order to get them out of the workshop, one had to negotiate a bend of just over 12 ft. 6 in. In addition, every part had to be of the simplest possible construction compatible with lightness.

Concurrently with the original investigation, the Cloudercraft Sailplane Co. was working on a similar project, and at one time the Pegasus was almost abandoned for Mr. Dickson's Junior.

The ply-covered fuselage of the Pegasus was made 12ft. 6in. long and built up on spruce longerons and four main bulkheads, with a number of stiffeners, and light intermediate bulkheads. A rectangular box-section was adopted to avoid the difficulty of bevelling longerons and making vee bottoms and decks. The top of the fuselage has a deep vee fairing of fabric on a stringer and a number of formers.

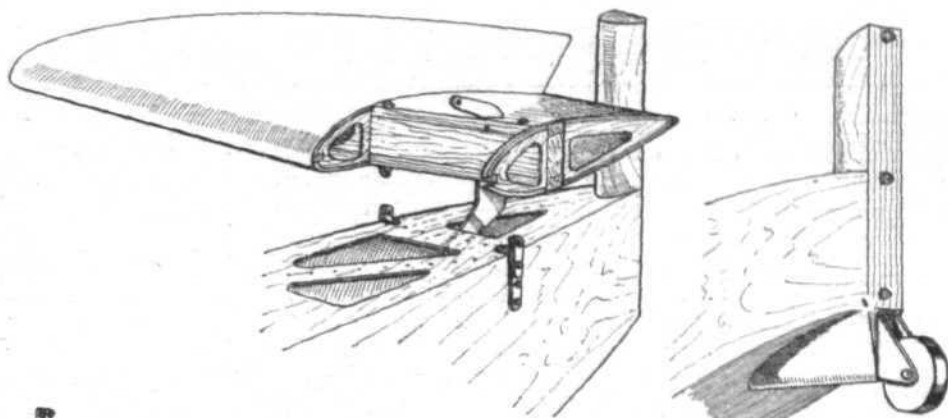
In this article Mr. H. J. Penrose, who, incidentally, is chief test pilot to Westland Aircraft Ltd., describes how he set out to design and build a small sailplane which would have a good performance and outstanding characteristics in the matter of portability.



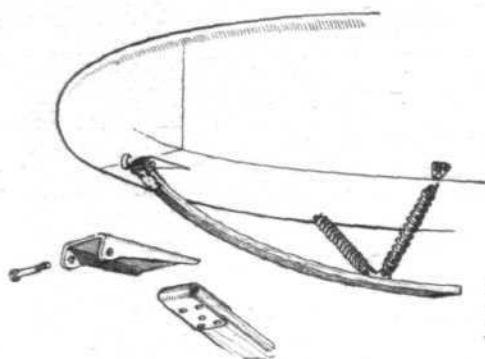
**THE PENROSE
"PEGASUS"**

Length o.a.	...	15ft. 6in.
Wing Span	...	34ft. 1½in.
Wing Area	...	91.8 sq. ft.
All up Weight	...	133lb.

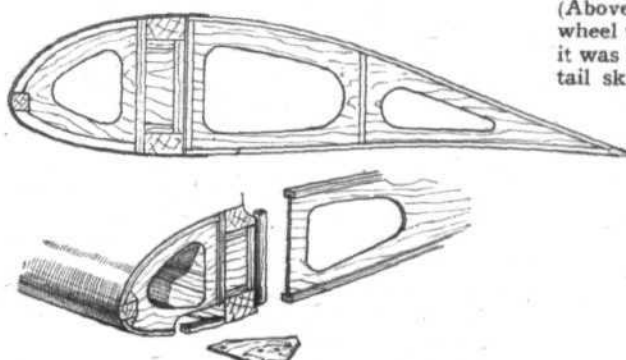
On the right are some constructional details of the balanced elevator of the Penrose sailplane. There is no fixed tailplane.



(Above) The all-rubber tail wheel which was fitted when it was found that the original tail skid had a tendency to break.



(Above) The central skid under the fuselage and details of its hinge. (Right) Elevation of a main wing rib and details of method of fastening it to the wing spar.



To obtain adequate ground clearance the ash skid was sprung by two relatively long telescopic members—actually obsolete Widgeon tail-skid members—and these formed a vee in front view; this, it was hoped, would enable the machine to stand up to drift landings with little damage. As a further precaution against side drift loads the fuselage attachment plates for the spring legs were made separate from the main lift-strut plates, which are also fitted at the same point on the fuselage. In practice this skid undercarriage has been found to work extraordinarily well.

The usual single-spar type of wing was adopted having a modified Göttingen 535 section, with a plan which was considered the optimum for the design. With a view to good controllability, long, narrow-chord ailerons were fitted, having a heavy differential. The difficulty and trouble of making a large number of jigs for the ribs of the tapered wing was overcome by adopting a suitably lightened three-ply web construction instead of the normal girder. Each web was drawn out full scale and cut to shape, and a second web for the opposite wing made by tracing off the first. Grooved flanges were then slipped over the profile of the rib, bent round by hand, and glued in place; the finished rib, which went to the full depth of the section, proved both light and strong. Ribs were afterwards cut in two at the spar juncture and secured to the spar by chocks. The three-ply leading edge was glued to each rib, and, of course, made a further and very strong attachment, whilst horizontal gussets further stiffened the attachment of the rear half. The spar itself consisted of two relatively heavy flanges of spruce with a three-ply web at the rear and stiffened with diaphragms.

Because of the small workshop and to facilitate transport, the wing was made in three parts, attached together by the usual system of plates and horizontal pins. Strut bracing was

adopted, as this gave a lighter structure, and, it was considered, would stiffen the structure against handling and landing loads. All internal woodwork was varnished, and the structure completely covered with aircraft fabric, instead of adopting the more usual method of gluing the fabric to the end of the nose-box and varnishing the leading edge. The fabric was sewn to each rib.

The floating tail and the rudder (of ample area) were of similar construction to the main planes, and these units were slightly balanced. The horizontal surface was mounted very simply and quite effectively by eye-bolts passing vertically through the spar and pinning the eye to a plate bolted to a sturdy bulkhead.

Tests with the machine have proved it to be more successful than anticipated, the only trouble so far experienced being broken main and tail skids. The former trouble has been overcome with a stiffer skid, and the latter by fitting a small all-rubber (and therefore shock-absorbing) tail-wheel.

Controls have been found most effective, and the machine is extremely manoeuvrable, as might be anticipated from its small inertia. Turns can be carried out on ailerons alone. At Sutton Bank the Pegasus behaved very well, despite the fact that it was the pilot's first experience of soaring; although loaded to 3 lb./sq. ft., the sailplane seemed to have a good speed range and was able to fly as slowly as machines having less loading.

The handling party were full of praise, because two energetic men could carry the machine.

Although B.G.A. load factors were in general exceeded in the design, the all-up weight was found to be only 133 lb., or 3 lb. more than calculated. The area is 91.8 sq. ft., and the loading 3 lb./sq. ft. The sinking speed is alleged to be 2.7 ft./sec. with an L/D of 1 in 20.5.

AIR-LINE PROPAGANDA

Wings Across Continents (The K.L.M. Amsterdam-Batavia Line), by E. Rusman. 2.25 guilders. Andries Blitz, Amsterdam. Obtainable from K.L.M. office.

It is difficult to imagine that anyone could even glance through Mr. Rusman's book without conceiving an immediate desire to travel to the East—and, preferably, to travel by air. It would be difficult, too, to imagine that any person with normal "biblio-kleptomania" could, after looking at *Wings Across Continents*, fail to covet it.

Beautifully illustrated with the very best of impressionistic and other photographs, drawings and maps, it is at once a

readable travel book, a complete guide to the K.L.M. route to the East and an entertaining history. In our insular manner history is taught in this country too narrowly from the angle of the Englishman, and it is always interesting, therefore, to read other histories—such as the rapid surveys found in Mr. Rusman's book.

In the appendix useful and interesting information is given concerning the effect of winds on ground speeds and compass courses, radio direction finding, blind flying and the reasons for high or low altitude flying on long journeys. Inside the back cover is a complete map of the winter and summer routes to Batavia.

THE INDUSTRY

Leeds Piston-ring Service

WELLWORTHY, LTD., the piston and piston ring manufacturers, of Lymington, Hants, announce the opening of a Yorkshire service depot at 82, Woodhouse Lane, Leeds.

A "Pou" on Show

MR. S. V. APPLEBY'S *Pou*, which has a Carden-Ford engine, will be exhibited at the Ford Motor Exhibition, which opens to-day at the Albert Hall.

The Airline Merger

LAST Thursday, at an extraordinary general meeting, the shareholders of Hillman's Airways agreed to the proposed amalgamation with the internal air line companies whose names were given in *Flight* of October 3. The new company will be known as Allied British Airways, Ltd.

A Blackburn Branch

IT is announced that the Blackburn Aeroplane and Motor Co., Ltd., is to reopen its old works at Roundhay, Leeds, where many machines were built during the war. Pressure of work has recently become so great that accommodation is required in addition to the Brough factory.

Expansion

NOBEL CHEMICAL FINISHES, LTD., who make, among many other preparation, aircraft dopes and varnishes, are now installed in their new offices at Nobel House, Buckingham Gate, London, S.W.1—premises once occupied by their parent company, Imperial Chemical Industries. All the N.C.F. factories, incidentally, are being extended, and a site for a new works has been secured at Stowmarket, Suffolk.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

HIGH-POWERED AERO ENGINES, LTD. Private company, registered October 9. Capital, £100 in £1 shares. Objects: To manufacture, repair and deal in aircraft engines, fittings and accessories. First directors not named. Solicitors: Clifford Turner and Co., 11, Old Jewry, London, E.C.2.

EUROPEAN AND AMERICAN AIRWAYS, LTD. Registered as a public company on October 7. Nominal capital, £5,000 in £1 shares. Objects: Aerial transport of passengers, merchandise, etc. First directors: Augustine Courtauld, Gustaf G. R. Rodd, Svend A. Dohm. Registered office: Hamilton House, 19, Buckingham Gate, London, S.W.1.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.).

Published October 17, 1935.

- 4743. BOUTON AND PAUL, LTD., NORTH, J. D., HUGHES, H.A., and DOE, A.: Mechanism for controlling gun turrets (435,185).
- 8097. TRANUM, V. M. (Legal representative of TRANUM, J., deceased): Automatic release for parachutes (435,267).
- 8390. PULLIN AND CO., LTD., R. B., PULLIN, R. B., and PENGELLY, C. G.: Gyroscopic compasses (435,309).
- 8439. BENDIX AVIATION CORPORATION: Force-transmission mechanism (435,456).
- 29258. BOYKOW, J. M.: Gyroscopic pendulum for craft (435,353).
- 31019. HILLIER, A. (Sperry Gyroscope Co., Inc.): Flight indicators for aircraft (435,355).

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1656: Effect of Wing Setting on Water Performance of Seaplanes, by W. G. A. Perring, price 9d. No. 1661: Expanding Passages on Aircraft, by F. B. Bradfield, price 6d. No. 1663: Air Density Effect in Spinning, by S. B. Gates and A. V. Stephens, price 9d. H.M. Stationery Office, Kingsway, London, W.C.2.

North to the Orient. By Anne Morrow Lindbergh. Price 10s. 6d., Chatto and Windus, 40-42, Chandos Street, London, W.C.2.

Aircraft. By Le Corbusier. The New Vision Series. Price 5s. The Studio Ltd., 44, Leicester Square, London, W.C.2.

INCREASES OF CAPITAL

AVIATION CLUBS, LTD. (41a, Albemarle Street, London, W.1).—The nominal capital has been increased by the addition of £1,300 in £1 ordinary shares beyond the registered capital of £1,200.



A MODERN EXAMPLE of AERODROME FIRE-FIGHTING EQUIPMENT

The fact that it is a good many years since a serious accident occurred at the Airport of London does not lessen the need for efficient crash equipment, and these photographs show the Croydon fire tender, which has recently been brought right up to date by the makers, The General Fire Appliance Company, of Queen Victoria Street, London. Three 30-gallon Bromylene foam tanks have been added, and are equipped with highly efficient "spreaders." Among the items of equipment which can be seen are: smoke mask and 80 ft. air tube; knives, electric torch and Pyrene extinguishers (on locker door); asbestos helmets and gloves; and Parnell tube cutter. The chassis is a Ford.

